

Software User Guide

Cayman Operating System Version 6.3



Cayman 3000 series by Netopia

January 2002



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Introduction

Section 1

About Cayman Documentation

Netopia, Inc. provides a suite of technical information for its Cayman-series family of intelligent enterprise and consumer Gateways. It consists of:

- *Software User Guide*
- *Hardware and Installation User Guide*
- Dedicated Quickstart booklets
- Specific White Papers

The documents are available in electronic form as Portable Document Format (PDF) files. They are viewed (and printed) from Adobe Acrobat Reader, Exchange, or any other application that supports PDF files.

They are downloadable from Cayman's website: <http://www.cayman.com/>

Intended Audience

This guide is targeted to the technical staffs of organizations such as:

- Incumbent Local Exchange Carriers (ILEC)
- Competitive Local Exchange Carriers (CLEC)
- Multiple System Operators (MSO)
- Internet Service Providers (ISP)

These professional staffs include:

- System administrators
- Installation and configuration technicians
- Customer support engineers

They are responsible for planning, deploying, and supporting the Customer Premise Equipment that are the key elements of small business or residential Local Area Networks.

Business and residential subscribers are encouraged to use this guide also.

Documentation Conventions

General

This manual uses the following conventions to present information:

Convention (Typeface)	Description
<i>bold italic monospaced</i>	Menu commands and button names
<i>bold italic sans serif</i>	Web GUI page links
terminal	Computer display text
bold terminal	User-entered text
<i>Italic</i>	Italic type indicates the complete titles of manuals.

Internal Web Interface

Convention (Graphics)	Description
dot-dot-dash rounded rectangle or line	Denotes an “excerpt” from a Web page or the visual truncation of a Web page
solid rounded rectangle with an arrow	Denotes an area of emphasis on a Web page

Command Line Interface





Syntax conventions for the Cayman gateway command line interface are as follows:

Convention	Description
straight ([]) brackets in cmd line	Optional command arguments
curly ({ }) brackets, with values separated with vertical bars ().	Alternative values for an argument are presented in curly ({ }) brackets, with values separated with vertical bars ().
bold terminal type face	User-entered text
<i>italic terminal type face</i>	Variables for which you supply your own values

BOTH	Pointing to a CLI command, refers to both DSL and Ethernet WAN interfaces for Cayman Gateways
DSL	Pointing to a CLI command, refers only to DSL WAN interface (used with 3220-H family)
ENET	Pointing to a CLI command, refers only to ENET WAN interface (used with 2E-H family)

Icons

Icons used in the guide are:

Icon	Description
	NOTE Icon: Requests that you pay particular attention to a specified procedure or piece of information in the text. The NOTE message has a regular type style.
	CAUTION Icon: Suggests you review the referenced details and heed the instructions offered. The CAUTION message has a bold type style.
	WARNING Icon: <i>Demands that you observe the actions given in the text. The WARNING message has a bold italic type style.</i>
	COMPASS Icon: Points the user to additional information concerning the topic under discussion. The COMPASS message has a regular type style. It is used also to denote a Roadmap table.

Text

The words “Cayman Gateway” and “Gateway” refer to a standard unit from the Netopia Cayman 3000-Series product families.

The expressions “Release 6.3.0” and “R 6.3.0” refer to the most recent generally available Cayman Operating System: COS 6.3.0R0.

Organization

This guide consists of six sections, three appendixes including a glossary, and an index. It is organized as follows:

- **Section 1, “Introduction”** — Describes the Cayman document suite, the purpose of, the audience for, and structure of this guide. It presents a table of conventions.
- **Section 2, “About Cayman Gateways”** — Presents a product description and overview of the extensive features of your Cayman gateway including a listing of new capabilities that are included with Cayman Operating System COS 6.3. A “Roadmap” of features and How To topics is shown.
- **Section 3, “Overview of Major Capabilities,”** — Itemizes Local Area Network, Wide Area Network, Security, Management, and Software Feature Keys features and functionalities.
- **Section 4, “Web-based User Interface,”** — Organized in the same way as the web UI is organized. As you go through each section, functions and procedures are discussed in detail.
- **Appendix A, “Tour of the Command Line Interface,”** — Describes all the current text-based commands for both the SHELL and CONFIG modes. A summary table and individual command examples for each mode is provided.
- **Appendix B, “Glossary”**
- **Index**



About Cayman-series Gateways

Section 2

Basic Product Structure

Units from the Netopia Cayman-series Gateway family are supplied in many configurations. This presents end-users with many alternatives for Wide Area Network (WAN) interfaces and Local Area Network (LAN) interfaces. This is the current product roster that supports COS 6.3:

Cayman Model No.	WAN Interface	LAN Wired Ethernet Hub	LAN Wired Options	LAN Wireless Option
3220-H	Full-Rate Discrete Multi-Tone (DMT) Asynchronous Digital Subscriber Line (ADSL)	Four ports 10 BaseT		
3220-H-W11	ADSL	Four ports 10 BaseT		802.11b Protocol
3220-H-WRF	ADSL	Four ports 10 BaseT		HomeRF Protocol
2E	Ethernet	One port 10 BaseT		
2E-H	Ethernet	Eight ports 10 BaseT		
2E-H-W11	Ethernet	Eight ports 10 BaseT		802.11b Protocol
2E-H-WRF	Ethernet	Eight ports 10 BaseT		HomeRF Protocol
3445	ADSL	Four ports 10/100 Ethernet	HPNA	PCMCIA 802.11b Protocol
3543	ADSL	Four ports 10/100 Ethernet		
3485	Ethernet	Four ports 10/100 Ethernet	HPNA	PCMCIA 802.11b Protocol
3583	Ethernet	Four ports 10/100 Ethernet		

What's New in Version 6.3

The new features for COS 6.3 are:

New Embedded Web Server

Not only is the look and feel different, but the database and the web server engine are new and more flexible.

The design of the new web server is geared to make navigation easier, providing the most commonly used items first. Context-sensitive help is provided.

Maintenance Enhancements

The maintenance enhancements are:

Computer Names

In addition to the IP address, the computer name is now listed in the DHCP lease table and the WAN users table. This allows users to more easily identify the computers in these tables. The computer name is only known if using DHCP to get its IP address.

Updater

This application, Updater Version 1.1, prepares the Gateway for installation of COS 6.3

Updater V 1.1 is required for users running COS 5.6.2 or lower.

For complete details see [page 84](#) of this document.

802.11b Wireless Update

Improved software to support 802.11b wireless base stations response to client requests made after an extended period of LAN inactivity.

NIST UTC Reference Signal

Cayman Gateways acquire the Universal Coordinated Time reference signal from the National Institute of Standards and Technology. This provides date and time information for log entries.

Capabilities Roadmap for COS 6.3

Cayman Gateways support a wide array of features and functionality. This roadmap points you to overview discussions and How To procedures.



Capabilities Roadmap: Cayman Gateways with COS 6.3

	Feature	New for COS 6.3	Outline Page	Details
General				
	Software Feature Keys	Yes	14	93
Management				
	Embedded Web Server	Changed	15	29
	Diagnostics		15	99
LAN				
	DHCP Server		16	59
	DHCP Relay-agent		16	59
	DNS Proxy		16	124
WAN				
	DHCP Client		17	123
	PPPoE		17	136
	Multiple PPPoE Sessions	Yes		
	Static IP Address		18	41
	IPMaps (Multiple Static IP Addresses)	Yes	18	52
	Pinholes		21	46
	User Limits	Yes		103
Security				
	Password Protection		19	66
	Network Address Translation (NAT)		19	
	Instant-On PPP		17	138
	Security Monitoring Log	Yes	22	80
	VPN IPSec Pass Through		27	73
	SafeHarbour VPN IPSec Tunnel	Yes	28	73
	BreakWater Basic Firewall	Yes	26	69



Overview of Major Capabilities

Section 3

This section describes the principal features of Cayman Operating System version 6.3. The information is grouped by usage area.

General

Feature Keys

Certain functionality in this release is controlled through software feature keys. These keys are proprietary files with the following properties:

- They are specific to the serial number of the target unit.
- Once installed, and the Gateway restarted, the desired enhancement is enabled, which then allows full access to:
 - Configuration
 - Operation
 - Maintenance
 - Administration
- They will **not** enable the desired feature on a unit with the **wrong** serial number.
 - They are rejected upon “Restart”, **not** when the file is downloaded.

Enhanced capabilities requiring a feature key include:

- Tiered Operating System
- Security Monitoring Log
- BreakWater Basic Firewall
- SafeHarbour IPSec Tunnel Termination



Many Netopia Cayman-series Gateways ship with particular feature key sets pre-enabled. You can check the feature keys enabled on your Gateway in the System Status web page. See [“System Status” on page 101](#).

Management

Embedded Web Server

There is no specialized client software required to configure, manage, or maintain your Cayman Gateway. Web pages embedded in the operating system provide access to the following Gateway operations:

- Setup
- System and security logs
- Diagnostics functions

Once you have removed your Cayman Gateway from its packing container and powered the unit up, use any LAN attached PC or workstation running a common web browser application to configure and monitor the Gateway.

Diagnostics

In addition to the Gateway's visual LED indicators, you access an extensive suite of diagnostic facilities by browsing to the unit.

Two of the facilities are:

- Automated "Multi-Layer" Test

The **Run Diagnostics** link initiates a sequence of tests. They examine the functionality of the Gateway, from the physical connections (OSI Layer 1) to the application traffic (OSI Layer 7).

- Network Test Tools

Three test tools to determine network reachability are available:

- Ping - tests the "reachability" of a particular network destination by sending an ICMP echo request and waiting for a reply.
- TraceRoute - displays the path to a destination by showing the number of hops and the router addresses of these hops.
- NSLookup - converts a domain name to its IP address and vice versa.

The system log also provides diagnostic information.



Your Service Provider may request information that you acquire from these various diagnostic tools. Individual tests may be performed at the command line. (See Appendix A).

Local Area Network

DHCP (Dynamic Host Configuration Protocol) Server

DHCP Server functionality enables the Gateway to assign your LAN computer(s) a “private” IP address and other parameters that allow network communication. The default DHCP Server configuration of the Gateway supports up to 253 LAN IP addresses.

This feature simplifies network administration because the Gateway maintains a list of IP address assignments. Additional computers can be added to your LAN without the hassle of configuring an IP address.

DHCP (Dynamic Host Configuration Protocol) Relay Agent

DHCP Relay functionality enables the Gateway to forward a DHCP client request to a specified DHCP Server. This assigned DHCP Server will reply to the request with an IP address and other network parameters.

DNS Proxy

Domain Name System (DNS) provides end users with the ability to look for devices or web sites through the use of names, rather than IP addresses. For websurfers, this technology allows a user to enter the URL (Universal Resource Locator) text string to access a desired website. Each text string identifier has an associated IP address, a series of numbers in the format of xxx.xxx.xxx.xxx (e.g. 147.240.101.006). It is DNS servers that are responsible for this text-to-IP Address translation. DNS Servers, in most cases, are located at Internet Service Provider facilities. They translate domain names into the desired IP address for locating an Internet website by answering DNS requests.

The Cayman DNS Proxy feature allows the LAN-side IP address of the Gateway to be used for proxying DNS requests from hosts on the LAN to the DNS Servers configured in the gateway. This is accomplished by having the Gateway's LAN address handed out as the “DNS Server” to the DHCP clients on the LAN.



The Cayman DNS Proxy only proxies UDP DNS queries, not TCP DNS queries.

Wide Area Network

DHCP (Dynamic Host Configuration Protocol) Client

DHCP Client functionality enables the Gateway to request an IP address from your Service Provider. DHCP servers on your Service Provider's network reply to DHCP Client requests and assign the network parameters.

PPPoE (Point-to-Point Protocol over Ethernet)

The PPPoE specification, incorporating the PPP and Ethernet standards, allows your computer(s) to connect to your Service Provider's network through your Ethernet WAN connection. The Netopia Cayman-series Gateway supports PPPoE, eliminating the need to install PPPoE client software on any LAN computers.

Service Providers may require the use of PPP authentication protocols such as Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP). CHAP and PAP use a username and password pair to authenticate users with a PPP server.

A CHAP authentication process works as follows:

1. The password is used to scramble a challenge string.
2. The password is a shared secret, known by both peers.
3. The unit sends the scrambled challenge back to the peer.

PAP, a less robust method of authentication, sends a username and password to a PPP server to be authenticated. PAP's username and password pair are not encrypted, and therefore, sent "unscrambled".

Instant-On PPP

You can configure your Gateway for one of two types of Internet connections:

- Always On
- Instant On

These selections provide either an uninterrupted Internet connection or an as-needed connection.

While an Always On connection is convenient, it does leave your network permanently connected to the Internet, and therefore potentially vulnerable to attacks.

Cayman's Instant On technology furnishes almost all the benefits of an Always-On connection while providing two additional security benefits:

- Your network cannot be attacked when it is not connected.

- Your network may change address with each connection making it more difficult to attack.

When you configure Instant On access, you can also configure an idle time-out value. Your Gateway monitors traffic over the Internet link and when there has been no traffic for the configured number of seconds, it disconnects the link.

When new traffic that is destined for the Internet arrives at the Gateway, the Gateway will instantly re-establish the link.

Your service provider may be using a system that assigns the Internet address of your Gateway out of a pool of many possible Internet addresses. The address assigned varies with each connection attempt, which makes your network a moving target for any attacker.

Static IP Addresses

If your Service Provider requires the Cayman Gateway to use Static IP addressing, you must configure your Gateway for it. Dynamically assigned addresses allow a service provider's customer to install their Gateway without WAN configuration. Static addresses never time out; dynamic addresses time out and will be reassigned.

A static IP address is preferred for setting up and maintaining pinholes through the Cayman Gateway's NAT security facility.

Your Service Provider may not offer a static IP address option.

IPMaps

IPMaps supports one-to-one Network Address Translation (NAT) for IP addresses assigned to servers, hosts, or specific computers on the LAN side of the Cayman Gateway.

With IPMaps, a Service Provider-assigned static IP address is mapped to a specific internal device. This allows a LAN-located device to appear public without compromising other locally attached devices. The external IP addresses must be on the same subnet.

IPMaps is used for applications such as Web, email, and FTP servers.



See ***How To: Configure for IPMaps*** on [page 52](#) for more information.

Security

Password Protection

Access to your Cayman device is controlled through two access control accounts, **Admin** or **User**.

- The **Admin**, or administrative user, performs all configuration, management or maintenance operations on the Gateway.
- The **User** account provides monitor capability **only**.
A user may **NOT** change the configuration, perform upgrades or invoke maintenance functions.

For the security of your connection, an Admin password must be set on the Cayman unit.

Network Address Translation (NAT)

The Cayman Gateway Network Address Translation (NAT) security feature lets you conceal the topology of a hard-wired Ethernet or wireless network connected to its LAN interface from routers on networks connected to its WAN interface. In other words, the end computer stations on your LAN are **invisible** from the Internet.

Only a **single WAN IP address** is required to provide this security support for your entire LAN.

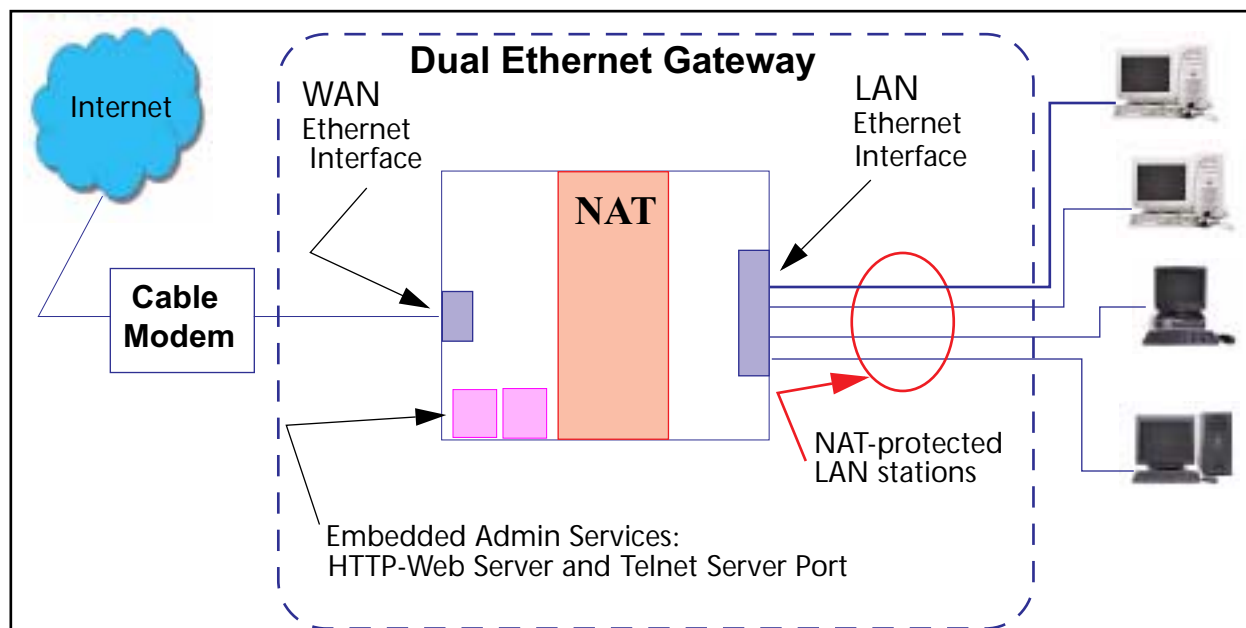
LAN sites that communicate through an Internet Service Provider typically enable NAT, since they usually purchase only one IP address from the ISP.

- When NAT is **ON**, the Cayman Gateway “proxies” for the end computer stations on your network by pretending to be the originating host for network communications from non-originating networks. The WAN interface address is the only IP address exposed.

The Cayman Gateway tracks which local hosts are communicating with which remote hosts. It routes packets received from remote networks to the correct computer on the LAN (Ethernet A) interface.

- When NAT is **OFF**, a Cayman Gateway acts as a traditional TCP/IP router, all LAN computers/devices are exposed to the Internet.

A diagram of a typical NAT-enabled LAN is shown below:



A similar configuration applies to a DSL WAN interface (3220 family).



1. The default setting for NAT is **ON**.
2. Cayman uses Port Address Translation (PAT) to implement the NAT facility.
3. NAT Pinhole traffic (discussed below) is always initiated from the WAN side.

Cayman Advanced Features for NAT

Using the NAT facility provides effective LAN security. However, there are user applications that require methods to selectively by-pass this security function for certain types of Internet traffic.

Cayman Gateways provide special pinhole configuration rules that enable users to establish NAT-protected LAN layouts that still provide flexible by-pass capabilities.

Some of these rules require coordination with the unit's embedded administration services: the internal Web (HTTP) Port (TCP 80) and the internal Telnet Server Port (TCP 23).

Internal Servers

Related to the pinhole configuration rules is an internal port forwarding facility that enables you to:

- Direct traffic to specific hosts/computers on the LAN side of the Gateway.
- Eliminate conflicts with embedded administrative ports 80 and 23.

Pinholes

This feature allows you to:

- Transparently route selected types of network traffic using the port forwarding facility.
 - FTP requests or HTTP (Web) connections are directed to a specific host on your LAN.
- Setup multiple pinhole paths.
 - Up to 32 paths are supported
- Identify the type(s) of traffic you want to redirect by port number.

Common TCP/IP protocols and ports are:

FTP (TCP 21)	telnet (TCP 23)
SMTP (TCP 25)	HTTP (TCP 80)
SNMP (TCP 161, UDP 161)	

See [page 47](#) for How To instructions.

Default Server

This feature allows you to:

- Direct your Gateway to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- Enable it for certain situations:
 - Where you cannot anticipate what port number or packet protocol an in-bound application might use.
For example, some network games select arbitrary port numbers when a connection is opened.
 - When you want all unsolicited traffic to go to a specific LAN host.



Default Server is not available for traffic inbound via a SafeHarbour IPsec tunnel.

See [page 56](#) for How To instructions.

Combination NAT Bypass Configuration

Specific pinholes and Default Server settings, each directed to different LAN devices, can be used together.



Creating a pinhole or enabling a Default Server allows inbound access to the specified LAN station. Contact your Network Administrator for LAN security questions.

Security Monitor

The Security Monitor detects security related events including common types of malicious attacks and writes them to a dedicated security log file. You view this log file from either:

- Cayman Web interface
- Text-based command line interface using a telnet or serial port facility

The log provides information useful in identifying a specific type of attack and tracing its origin. The log maintains 100 entries, and requires a manual reset once full. This preserves for troubleshooting purposes the acquired information about specific attacks, their frequency and tracing information.



See [page 80](#) for more information about the Security Monitoring Log.

COS 6.3 Security Monitor software reports the following eight event types:

- IP Source Address Spoofing
- Source Routing
- Subnet Broadcast Amplification
- Illegal Packet Size (Ping of Death)
- Port Scan (TCP/UDP)
- Excessive Pings
- Admin Login Failure
- MAC Address Spoofing

Event Details

Details on the eight specific event types and the information logged are:

IP Source Address Spoofing

The Gateway checks all incoming packets to see if the IP address attached is valid for the interface the packet is received through. If the address of the packet is not valid for the interface the packet is discarded.

Logged information includes:

IP source address	IP destination address
Number of attempts	Time at last attempt
IP interface	

Source Routing

IP source routing information packets will be received and accepted by the Cayman Gateway. Logging of this activity is provided in the event the source route information has been forged, but appears as valid data.

Logged information includes:

IP source address	IP destination address
Number of attempts	Time at last attempt
IP interface	

Subnet Broadcast Amplification

Distributed DoS (Denial of Service) attacks often use a technique known as broadcast amplification, in which the attacker sends packets to a router's subnet broadcast address. This causes the router to broadcast the packet to each host on the subnet. These, in turn, become broadcast sources, thereby involving many new hosts in the attack. The Cayman unit detects and discards any packets that would otherwise be transmitted to a subnet broadcast address. The Security Monitoring logs the event.

Logged information includes:

IP source address	IP destination address
Number of attempts	Time at last attempt
IP broadcast address	

Illegal Packet Size (Ping of Death)

The maximum size of an IP packet is 64K bytes, but large packets must usually be fragmented into smaller pieces to travel across a network. Each fragment contains some information that allows the recipient to reassemble all of the fragments back into the original packet. However, the frag-

mentation information can also be exploited to create an illegally sized packet. Unwary hosts will often crash when the illegal fragment corrupts data outside of the “normal” packet bounds. The Cayman unit will detect and discard illegal packet fragments, and the Security Monitoring software logs the event.

Logged information includes:

IP source address	IP destination address
Number of attempts	Time at last attempt
Illegal packer size	

Port Scan

Port scanning is the technique of probing to determine the list of TCP or UDP ports on which a host, or in our case, a Gateway is providing services. For example, the HTTP service is usually available on TCP port 80. Once hackers have your port list, they can refine their attack by focusing attention on these ports. According to the TCP/IP/UDP standards, a host will return an ICMP (Internet Control Message Protocol) message stating “port unreachable” on all inactive ports. The Security Monitoring software monitors these circumstances, and will log an alert if it appears the cause is the result of someone running a port scan.

Logged information includes:

Protocol type	IP source address
Time at last attempt	Number of ports scanned
Highest port	Lowest port
Port numbers of first 10 ports scanned	

Excessive Pings

The PING (Packet InterNet Groper) Utility is used by hackers to identify prospective targets that can be attacked. The Security Monitoring software will record instances where the router itself is pinged by the same host more than ten times.

Logged information includes:

IP source address	IP destination address
Number of attempts	Time at last attempt

Login Failures

The Cayman software provides the means for assigning passwords to the Admin or User accounts to control access to the Gateway. Any attempts to login are given three chances to enter a valid password. The Security Monitoring software records instances where the user fails to enter a valid password.

Logged information includes:

IP source address	Number of attempts
Attempt count	Time at last attempt

MAC Address Spoofing

A MAC (Media Access Control) Address Spoofing Attack can be identified based on the IP-interface where the illegitimate packet came from. If the interface that the spoofed packet arrives on does not have the same MAC address as the legitimate entry in the routing table, then an attack is logged.

Logged information includes:

IP source address	Number of attempts
IP interface	Time at last attempt

BreakWater Basic Firewall

BreakWater delivers an easily selectable set of pre-configured firewall protection levels. These settings are readily available for simple implementation through Cayman's embedded web server interface.

BreakWater provides you and your network with:

- Protection for all LAN users.
- Elimination of firewall management software on individual PC's.
- Immediate protection through three pre-configured firewall levels.
- Elimination of the complexity associated with developing firewall rules.



See [page 69](#) for ***How To Configure BreakWater*** instructions including a table of user tips.

BreakWater Settings

BreakWater Basic Firewall's **three** settings are:

ClearSailing

ClearSailing provides protection against network initiated inbound traffic, while securely passing outbound traffic through the Gateway. In conjunction with Network Address Translation, this setting allows authorized remote diagnostic support while protecting against undesired inbound traffic.

SilentRunning

Using this level of firewall protection allows secure transmission of outbound traffic, but disables any attempt for inbound traffic to identify the Gateway. This is the Internet equivalent of having an unlisted number.

LANdLocked

The third option available turns off all inbound and outbound traffic, isolating the LAN and disabling all WAN traffic.



BreakWater Basic Firewall operates independent of the Gateway's NAT functionality.

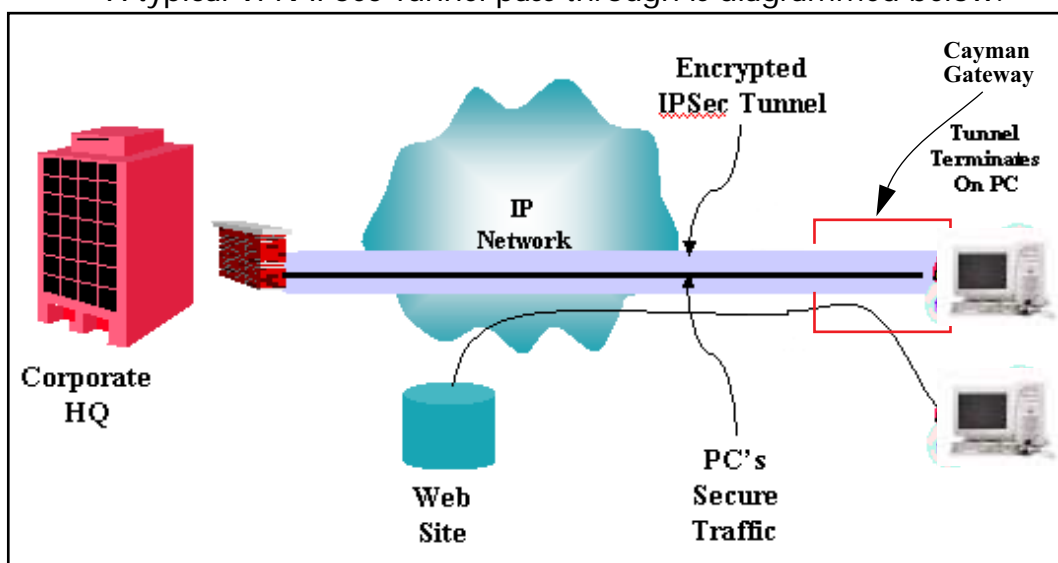
VPN IPSec Pass Through

This Cayman service supports your independent VPN client software in a transparent manner. Cayman has implemented an Application Layer Gateway (ALG) to support multiple PCs running IP Security protocols.

This feature has three elements:

1. On power up or reset, the address mapping function (NAT) of the Gateway's WAN configuration is turned on by default.
2. When you use your third-party VPN application, the Gateway recognizes the traffic from your client and your unit. It allows the packets to pass through the NAT "protection layer" via the encrypted IPSec tunnel.
3. The encrypted IPSec tunnel is established "through" the Gateway.

A typical VPN IPSec Tunnel pass through is diagrammed below:



Typically, no special configuration is necessary to use the IPSec pass through feature. This feature may need to be disabled for special VPN clients that are designed to be supported through NAT.

In the diagram, VPN PC clients are shown behind the Cayman Gateway and the secure server is at Corporate Headquarters across the WAN. You cannot have your secure server behind the Cayman Gateway.

When multiple PCs are starting IPSec sessions, they must be started one at a time to allow the associations to be created and mapped.

SafeHarbour VPN IPSec Tunnel

SafeHarbour VPN IPSec Tunnel provides a single, encrypted tunnel to be terminated on the Gateway, making a secure tunnel available for all LAN-connected Users. This implementation offers the following:

- Eliminates the need for VPN client software on individual PC's.
- Reduces the complexity of tunnel configuration.
- Simplifies the ongoing maintenance for secure remote access.

A VPN tunnel is a secure link between two networks interconnected over an IP network providing a secure, cost-effective alternative to dedicated leased lines.

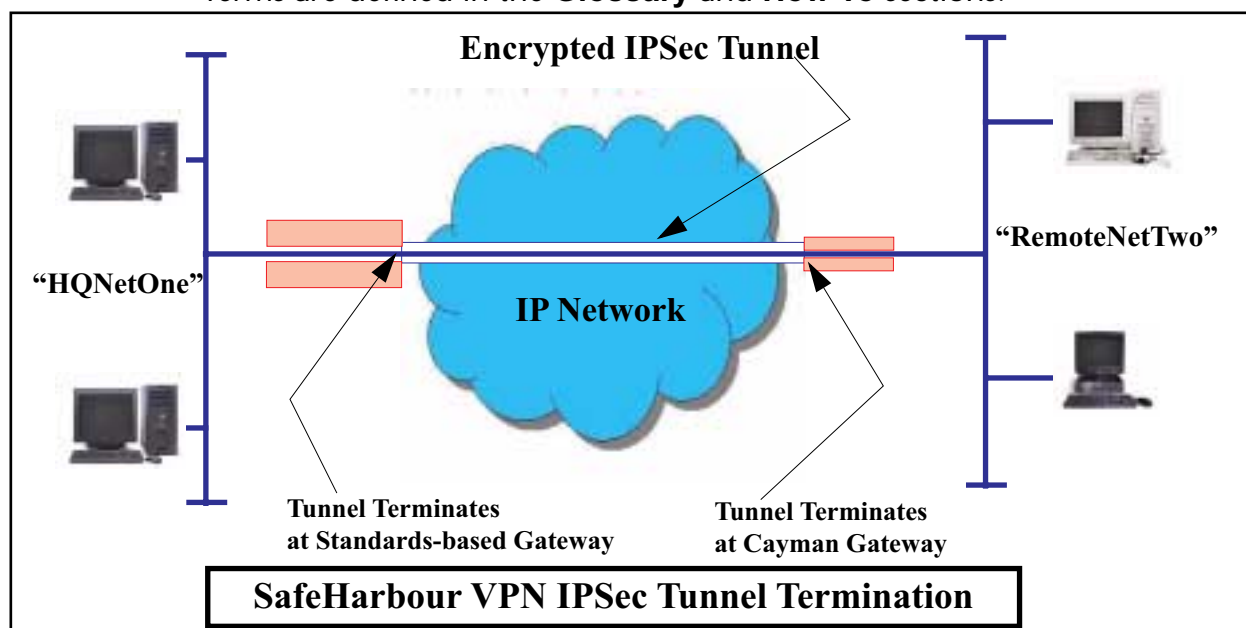
SafeHarbour employs VPN standards, including:

- **Internet Protocol Security (IPSec)** suite, a series of protocols including encryption, authentication, integrity, and replay protection.
- **Internet Key Exchange (IKE)**, a management protocol of IPSec.

Adherence to VPN standards allows seamless interoperability between a Cayman Gateway and another standards-based encryptor. SafeHarbour supports:

- Symmetric encryption protocols DES, 3DES, Blowfish, and CAST
- Hash algorithms MD5 and SHA1
- Diffie-Hellman groups 1, 2, and 5.

Terms are defined in the **Glossary** and **How To** sections.



An important feature of the SafeHarbour VPN IPSec Tunnel is secure encryption of the configured circuit in **both** directions.



Web-based User Interface

Section 4

Access the User Interface

Using the embedded Web-based user interface for the Netopia Cayman-series Gateway you can configure, troubleshoot, and monitor the status of your Gateway. For COS Version 6.3 the Web-based UI has been modified:

- To accomodate multiple new features of COS 6.3.
- To make using the entire facility easier.

Open the Web Connection

Once your Gateway is powered up, you can use any recent version of the best-known web browsers that support javascript and Cascading Style Sheets from any LAN-attached PC or workstation.

The procedure is:

- Step 1** Enter the name or IP address of your Cayman Gateway in the Web browser's window and click *Enter*.

For example, you would enter *http://192.168.1.254* if your Cayman Gateway is using its default IP address. You can enter *http://cayman-2e*. (including the final period) or *http://cayman-dsl*. if your computer has been configured to obtain its network configuration from a DHCP server.

- Step 2** If an administrator or user password has been assigned to the Cayman Gateway, enter *Admin* or *User* as the username and the appropriate password and click *OK*.

The Cayman Gateway Home page opens.



If the Gateway is not configured, after logon you will see the Quickstart page.

Home page

The Home page is the “dashboard” for your Cayman Gateway. The toolbar at the top provides links to controlling, configuring, and monitoring pages. Critical configuration and operational status is displayed in the center section. If you log on as Admin you see this page.

This example screen is from the Dual Ethernet Gateway.

General Information			
Hardware	Cayman-2E Model 500, 2 Ethernet ports		
Serial Number	705219		
Software Version	6.3.0 R0		
Product ID	0921		
WAN			
Status	Up		
IP Address	143.137.50.236		
Default Gateway	143.137.50.254	Netmask	255.255.255.0
DHCP Client	On	DHCP Lease Expires	00:00:49:50
NAT	On	WAN Users	Unlimited
LAN			
IP Address	192.168.1.254		
Netmask	255.255.255.0		
DHCP Server	On	DHCP Leases	1 out of 253 leases in use
DNS	143.137.50.254		

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The Home page differs slightly between DSL and Dual Ethernet Gateways.

Home page - User Mode, DSL Gateway

General Information			
Hardware	Cayman-DSL Model 3220-H, DMT-ADSL (Alcatel) plus 4-port hub		
Serial Number	1724849		
Software Version	6.3.0 R0		
Product ID	0829		
WAN			
Status	Up		
Local Address	143.137.199.3	Peer Address	143.137.199.254
Connection Type	Always On		
NAT	On	WAN Users	Unlimited
LAN			
IP Address	192.168.1.254		
Netmask	255.255.255.0		
DHCP Server	On	DHCP Leases	0 out of 253 leases in use
DNS	143.137.137.10		

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Home page - Information

The Home page's center section contains a summary of the Gateway's configuration settings and operational status.

Summary Information	
Field	Status and/or Description
General Information	
Hardware	Model number and summary specification
Serial Number	Unique serial number, located on label attached to bottom of unit
Software Version	Release and build number of running Cayman Operating System.
Product ID	Refers to internal circuit board series; useful in determining which software upgrade applies to your hardware type.
Optional (Keyed)	
- BreakWater Firewall	Indicates which BreakWater Basic Firewall protection level is enabled: ClearSailing, SilentRunning, or LANdLocked
WAN	
Status	Wide Area Network is either Up or Down
IP Address	IP address assigned to the WAN port.
Default Gateway	IP address of the host to which your Gateway sends network traffic when it can't find the destination host.
DHCP Client	Default setting lets a WAN host configure the IP address and other network settings for the WAN interface of your Cayman Gateway.
NAT	On or Off . ON if using Network Address Translation to share the IP address across many LAN users.
Netmask	Defines the IP subnet for the WAN
DHCP Lease Expires	Displays the amount of time remaining on current lease
WAN Users	Displays the number of users allotted and the total number available for use.
LAN	
IP Address	Internal IP address of the Cayman Gateway.
Netmask	Defines the IP subnet for the LAN Default is 255.255.255.0 for a Class C device
DHCP Server	On or Off . ON if using DHCP to get IP addresses for your LAN client machines.
DNS	IP address of the Domain Name Server.
Leases in Use	A "lease" is held by each LAN client that has obtained an IP address through DHCP.

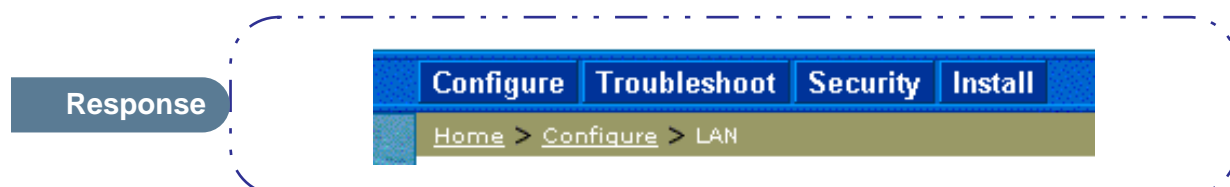
Toolbar

The toolbar is the dark blue bar at the top of the page containing the major navigation buttons. These buttons are available from almost every page, allowing you to move freely about the site. The example toolbar shown below is displayed when you log on as **Admin**. If you log on as **User**, some buttons will not be shown.

Home	Configure	Troubleshoot	Security	Install	Restart	Help
	Quickstart	System Status	Passwords	Install Keys		
	LAN	Network Tools	Firewall	Install Software		
	WAN	Diagnostics	IPSec			
	Advanced		Security Log			

Navigating the Web Interface

[Link](#) **Breadcrumb Trail**



Comment The breadcrumb trail is built in the light brown area beneath the toolbar. As you navigate down a path within the site, the trail is built from left to right. To return anywhere along the path from which you came, click on one of the links.

Restart

Button**Restart****Response**

Restart Gateway

Restarting the Gateway is needed to enable:

- Changes to your Gateway database configuration
- New feature keys
- Operating System Software Upgrades

When you restart:

- All users will be disconnected
- You will be returned to the Home page
- The Gateway will not respond to your web requests. This inactivity may last for approximately 2 minutes.

[Restart the Gateway](#)

Comment

The Restart button on the toolbar allows you to restart the Gateway at any time. You will be prompted to confirm the restart before any action is taken. The Restart Confirmation message explains the consequences of and reasons for restarting the Gateway

[Link](#)

Alert Symbol

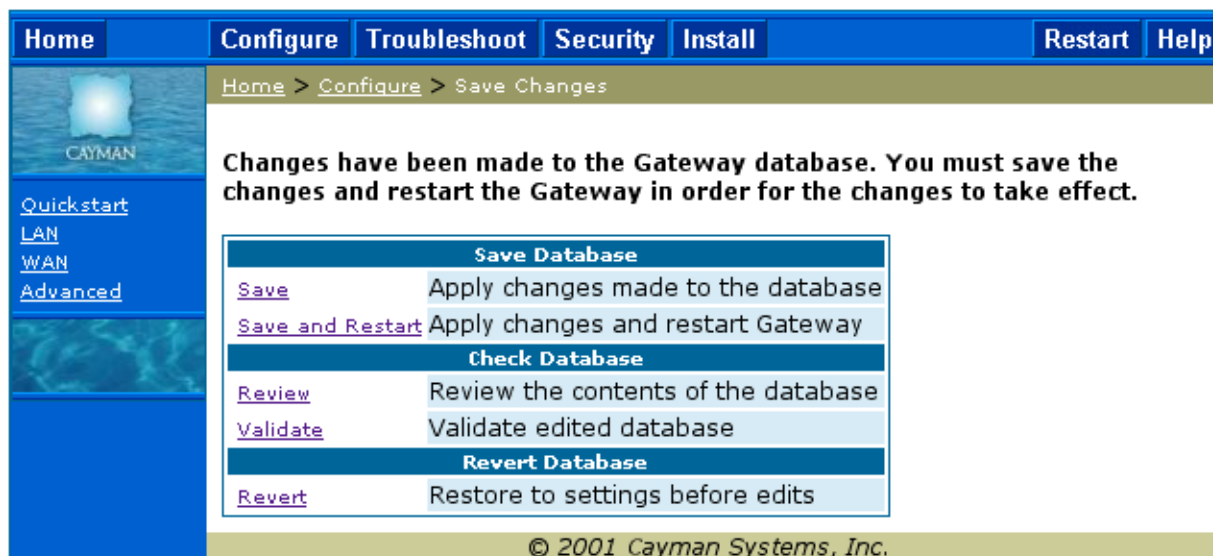
Response



Comment

The Alert symbol appears in the upper right corner under one of two circumstances:

1. a database change; one in which a change is made to the Gateway's configuration. The Alert serves as a reminder that you must **Save** the changes and **Restart** the Gateway before the change will take effect. You can make many changes on various pages, and even leave the browser for up to 8 minutes, but if the Gateway is restarted before the changes are applied, they will be lost. When you click on the Alert symbol, the Save Changes page appears. Here you can select various options to save or discard these changes.



2. a security event is logged. If you have Security Monitoring keyed, you receive Alerts whenever there is an event in the log that has not been viewed. When you click the Alert symbol the Security Log is displayed and the Alert clears.

If both types of Alert are triggered, you will need to take action to clear the first type of Alert before you can see the second Alert.

Help

Button

Help

Response

Cayman Gateway Help

Your Gateway supports Context Sensitive Help. Click on Help from within your page of interest and help for that page will be presented.

Documentation

The full product documentation is provided in electronic format. Documentation is also available online at <http://www.cayman.com>.

Cayman Technical Support

Cayman Technical Support can be reached at:

Telephone: 510-814-5000 ext 1

Web: www.netopia.com/support

Close Window

Comment

Context-sensitive Help is provided in Release 6.3. The page shown above is displayed when you are on the Home page or other transitional pages. To see a context help page example, go to **Security -> Passwords**, then click **Help**.

Configure

Button**Configure****Comment**

The Configuration options are presented in the order of likelihood you will need to use them. **Quickstart** is typically accessed during the hardware installation and initial configuration phase. **Often, these settings should be changed only in accordance with information from your Service Provider.** LAN and WAN settings are available to fine-tune your system. **Advanced** provides some special capabilities typically used for gaming or small office environments, or where LAN-side servers are involved.



This button will not be available if you log on as *User*.

Quickstart

How to Use the Quickstart Page

A blue trapezoidal icon with the words "HOW TO" in white capital letters.

HOW
TO

Quickstart is normally used immediately after the new hardware is installed. When you are first configuring your Gateway, Quickstart appears after you log on.

(Once you have configured your Gateway, logging on displays the Home page. Thereafter, if you need to use Quickstart, choose it from the Configure menu.)

The Quickstart page you see depends on your type of Gateway and the type of connection to your service provider. You may have one of the following types of connection to your service provider:

- DHCP (without PPP) - see [“Setup Your Gateway using a DHCP Connection” on page 37](#)
- PPP - see [“Setup Your Gateway using a PPP Connection” on page 40](#)
- Static IP Address - [“Setup Your Gateway using a Static IP Address” on page 41](#)

[Link](#) **Configure -> Quickstart**

Setup Your Gateway using a DHCP Connection

Response

The screenshot shows the Cayman Gateway web interface. The top navigation bar includes 'Home', 'Configure', 'Troubleshoot', 'Security', 'Install', 'Restart', and 'Help'. The breadcrumb trail is 'Home > Configure > Quickstart'. The main content area is titled 'Quickstart' and contains the following text: 'The basic Gateway configuration required to connect to your ISP is complete. In most cases, you should be ready to connect to the Internet. If you have further instructions from your Service Provider, including specific configuration parameters to be set, use the Quickstart Advanced link, if available, or go to Configure->WAN to set up your specific configuration.' Below this text is a box titled 'Other Quickstart Options' with a link labeled 'Advanced' followed by the text 'Configure System Name and Ethernet MAC Address'. The footer of the page reads '© 2001 Cayman Systems, Inc.'.

Comment

This example screen is for a **DHCP Quickstart** configuration. Your Service Provider will instruct you as to whether or not the Other Quickstart Options need to be configured. If they are not needed, you should be ready to access the Internet. If required, click the **Advanced** link to access the **Other Quickstart Options** page.

The Other Quickstart Options page allows you to change the System Name or your Gateway's Ethernet MAC address.

System Name is your Gateway's factory identifier combined with its serial number. By default, this identifier is automatically captured for this field.

The screenshot shows the 'Other QuickStart Options' page in the Cayman Gateway web interface. The top navigation bar is the same as the previous screenshot. The breadcrumb trail is 'Home > Configure > QuickStart > OtherQuickStart'. The main content area is titled 'Other QuickStart Options' and contains a form with two fields: 'System Name' with the value 'Cayman-2E705219' and 'Enable MAC Override' with an unchecked checkbox. A 'Submit' button is located below the fields. The footer of the page reads '© 2001 Cayman Systems, Inc.'.



Some broadband cable-oriented Service Providers use the **System Name** as an important identification and support parameter. If your Gateway is part of this type of network, do **NOT** alter the System Name unless specifically instructed by your Service Provider

If you need to change either of these fields, use the following procedure.

Change Procedure

Step 1 Enter your selected System Name.

You can use the default System name or select your own. The System Name can be 1-32 characters long.

Step 2 Select the *Enable MAC Override* checkbox.

A new field is displayed.

Other QuickStart Options	
System Name	<input type="text" value="Cayman-2E705219"/>
Enable MAC Override	<input checked="" type="checkbox"/>
MAC Address	<input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/>
<input type="button" value="Submit"/>	

Enter your 12-character Ethernet MAC override address as instructed by your service provider, for example: 12 34 AB CD 19 64

Step 3 Click *Submit*.

This turns on the Alert ("!") button in the top right corner of the page.

Step 4 Click the *Alert* button to go to the page to save your changes.

Step 5 Click on the *Save and Restart* link.

You will be returned to the Home page. A warning is displayed on this page while the Gateway restarts.

The screenshot shows the Cayman Gateway configuration web interface. At the top, there is a navigation bar with tabs: Home, Configure, Troubleshoot, Security, Install, Restart, and Help. The 'Home' tab is selected. Below the navigation bar, there is a 'Home' header with a warning icon. A prominent warning message is displayed: 'WARNING: The gateway is restarting and may be unresponsive for the next minute! Please wait, if this message does not disappear automatically after a minute, or an error is displayed, try hitting your browser's Refresh button.' Below the warning, there is a section titled 'General Information' containing the following details:

Hardware	Cayman-2E Model 500, 2 Ethernet ports		
Serial Number	705219		
Software Version	6.3		
Product ID	0921		

Below the general information, there is a section titled 'WAN' containing the following details:

Status	Up		
IP Address	143.137.50.203		
Default Gateway	143.137.50.254	Netmask	255.255.255.0
DHCP Client	On	DHCP Lease Expires	00:00:46:14
NAT	On	WAN Users	Unlimited

Below the WAN section, there is a section titled 'LAN' containing the following details:

IP Address	192.168.1.254		
Netmask	255.255.255.0		

Setup Your Gateway using a PPP Connection

Response

The screenshot shows a web-based configuration interface for a Cayman Systems Gateway. The top navigation bar includes links for Home, Configure, Troubleshoot, Security, Install, Restart, and Help. The breadcrumb trail indicates the current location: Home > Configure > QuickStart. On the left, a sidebar menu lists Configure, Troubleshoot, Security, and Install. The main content area displays a 'Quick Start' form with two input fields: 'ISP Username' and 'ISP Password', followed by a 'Submit' button. The footer of the interface shows the copyright notice: © 2001 Cayman Systems, Inc.

Comment

This example screen is the for a **PPP Quickstart** configuration. Your gateway authenticates with the Service Provider equipment using the ISP Username and Password. These values are given to you by your Service Provider.

Step 1 Enter your **ISP Username** and **ISP Password**.

Step 2 Click **Submit**.

This turns on the Alert ("!") button in the top right corner of the page.

Step 3 Click the **Alert** button to go to the page to save your changes.

Step 4 Click on the **Save and Restart** link.

You will be returned to the Home page. A warning is displayed on this page while the Gateway restarts.

Setup Your Gateway using a Static IP Address



If your service provider supplies you with a static IP address, your Gateway's Quickstart page will offer the fields required to enter the appropriate information for this type of configuration.

Configuration Procedure

The Quickstart page designed for a static IP address offers the following fields for you to supply the required information:

Step 1 Enter the values provided by your Internet Service Provider in the Quickstart fields. Complete the following fields:

Field	Description
WAN IP Address	The IP address assigned to your Cayman Gateway.
WAN IP Netmask	Defines the IP subnet mask for the WAN network connected to your Gateway.
Default Gateway	IP address of the host to which the Cayman Gateway should send network traffic when it can't find the destination host.
Domain Name	The domain name supplied by your service provider.
Primary DNS Server Address	The IP address of the primary DNS name server for your network.
Secondary DNS Server Address	The IP address of the backup DNS name server for your network.

Step 2 Click the **Submit** button to save the modified configuration.

Step 3 The **Alert** button appears. Click the **Alert** button.

- Step 4** When you see the Save Changes page, click the *Save and Restart* link to restart your Cayman Gateway with its new configuration settings.

You will be returned to the Home page. A warning is displayed on this page while the Gateway restarts.

- Step 5** After your Cayman Gateway restarts, use your browser to verify that you can access the Internet.

Your Cayman Gateway can now use the configured IP parameters



Do NOT confuse this procedure that establishes an IP address for the Gateway's default IP traffic with configuring multiple static IP addresses used with the IPMaps feature

LAN

[Link](#)[Configure -> LAN](#)

Response

LAN IP Interface (Ethernet 10BT)

Enable Interface ☒

IP Address

IP Netmask

Restrictions

Other LAN Options

Advanced	Configure advanced IP settings
DHCP Server	Configure DHCP server options
Wireless	Configure Wireless Options

Comment

* **Interface Enable:** Enables all LAN-connected computers to shared resources and to connect to the WAN. The Interface should always be enabled unless you are instructed to disable it by your Service Provider during troubleshooting.

* **IP Address:** The LAN IP Address of the Gateway. The IP Address you assign to your LAN interface must not be used by another device on your LAN network.

* **IP Netmask:** Specifies the subnet mask for the TCP/IP network connected to the virtual circuit. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask.)

* **Restrictions:** Specifies whether an administrator can open a Telnet connection to the Gateway over the LAN interface in order to monitor and configure the Gateway. On the LAN Interface, you can enable or disable administrator access. By default, administrative restrictions are turned off, meaning an administrator can open a Telnet connection through the LAN Interface.

WAN

[Link](#)[Configure -> WAN](#)

Response

Comment

WAN IP Interfaces

Your IP interfaces are listed. Click on an interface to configure it.

IP Gateway

Enable Gateway: You can configure the Gateway to send packets to a default gateway if it does not know how to reach the destination host.

Interface Type: If you have PPPoE enabled, you can specify that packets destined for unknown hosts will be sent to the gateway being used by the remote PPP peer.. If you select ip-address, you must enter the IP address of a host on a local or remote network to receive the traffic.

Default Gateway: The IP Address of the default gateway.

Other WAN Options

PPPoE: You can enable PPPoE and the number of PPPoE Sessions. The IP Interface(s) should be reconfigured after changing this setting.

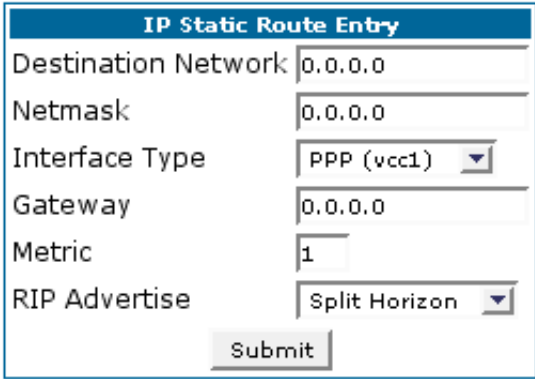
ATM: You can configure the ATM circuits and the number of Sessions. The IP Interface(s) should be reconfigured after making changes here.

Advanced

The following are links under Configure -> Advanced:

[Link](#)[Advanced](#)**Comment**

Selected Advanced options are discussed in the pages that follow. Many are self-explanatory or are dictated by your service provider.

[Link](#)[IP Static Routes](#)**Response**

The screenshot shows a web form titled "IP Static Route Entry". It contains the following fields and values:

IP Static Route Entry	
Destination Network	0.0.0.0
Netmask	0.0.0.0
Interface Type	PPP (vcc1) ▼
Gateway	0.0.0.0
Metric	1
RIP Advertise	Split Horizon ▼
<input type="button" value="Submit"/>	

Description

A static route identifies a manually configured pathway to a remote network. Unlike dynamic routes, which are acquired and confirmed periodically from other routers, static routes do not time out. Consequently, static routes are useful when working with PPP, since an intermittent PPP link may make maintenance of dynamic routes problematic. You can configure as many as 16 static IP routes for the Gateway.

[Link](#)

IP Static ARP

Response

IP Static ARP Entry	
IP Address	Hardware MAC Address
0.0.0.0	00 - 00 - 00 - 00 - 00 - 00

Submit

Description

Your Gateway maintains a dynamic Address Resolution Protocol (ARP) table to map IP addresses to Ethernet (MAC) addresses. It populates this ARP table dynamically, by retrieving IP address/MAC address pairs only when it needs them. Optionally, you can define static ARP entries to map IP addresses to their corresponding Ethernet MAC addresses. Unlike dynamic ARP table entries, static ARP table entries do not time out. The IP address cannot be 0.0.0.0. The Ethernet MAC address entry is in nn-nn-nn-nn-nn-nn (hexadecimal) format.

[Link](#)

Pinholes

Response

To create a new pinhole entry, press the "Add" button.

Pinholes
No pinhole entries have been defined

Add

Description

Pinholes allow you to transparently route selected types of network traffic, such as FTP requests or HTTP (Web) connections, to a specific host behind the Gateway. Creating a pinhole allows access traffic originating from a remote connection (WAN) to be sent to the internal computer (LAN) that is specified in the Pinhole page.

Contact your Network Administrator for LAN security questions. Pinholes are common for applications like multiplayer online games. Refer to software manufacturer application documentation for specific traffic types and port numbers.

Configure Specific Pinholes



Planning for Your Pinholes

Determine if any of the service applications that you want to provide on your LAN stations utilize TCP or UDP protocols. If an application does, then you must configure an Internal Server to implement port forwarding. This is accessed from the **Advanced -> Internal Servers** page.

Example: A LAN Requiring Three Pinholes

The procedure on the following pages describes how you set up your NAT-enabled Cayman Gateway to support three separate applications. This requires passing three kinds of specific IP traffic through to your LAN.

Application 1: You have a Web server located on your LAN behind your Cayman Gateway and would like users on the Internet to have access to it. With NAT "On", the only externally visible IP address on your network is the Gateway's WAN IP (supplied by your Service Provider). All traffic intended for that LAN Web server must be directed to that IP address.

Application 2: You want one of your LAN stations to act as the "central repository" for all email for all of the LAN users.

Application 3: One of your LAN stations is specially configured for game applications. Again, you want this specific LAN station to be dedicated to games.

A sample table to plan the desired pinholes is:

WAN Traffic Type	Protocol	Pinhole Name	LAN Internal IP Address
Web	TCP	my-webserver	192.168.1.1
Email	TCP	my-mailserver	192.168.1.2
Games	UDP	my-games	192.168.1.3

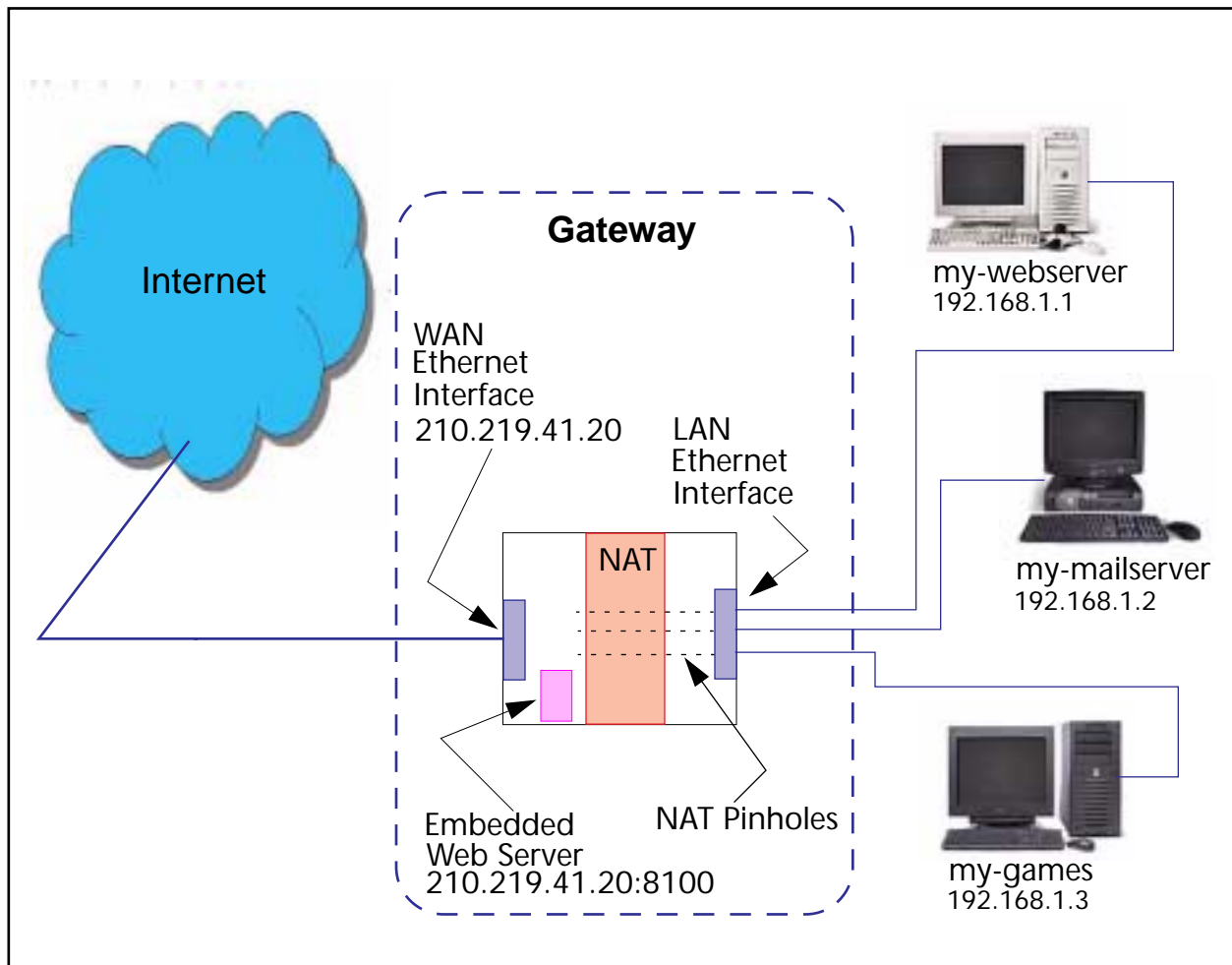
For this example, Internet protocols TCP and UDP must be passed through the NAT security feature and the Gateway's embedded Web (HTTP) port must be re-assigned by configuring new settings on the Internal Servers page.



TIPS for making Pinhole Entries

1. If the port forwarding feature is required for Web services, ensure that the embedded Web server's port number is re-assigned PRIOR to any Pinhole data entry.
2. Enter data for one Pinhole at a time.
3. Use a unique name for each Pinhole.
If you choose a duplicate name, it will overwrite the previous information without warning.

A diagram of this LAN example is:



Pinhole Configuration Procedure

Use the following steps:

- Step 1** From the *Configure* toolbar button -> *Advanced* link, select the *Internal Servers* link.

Since Port Forwarding is required for this example, the Cayman embedded Web server is configured first.



The two text boxes, **Web (HTTP) Server Port** and **Telnet Server Port**, on this page refer to the port numbers of the Cayman Gateway's *embedded administration ports*.

To pass Web traffic through to your LAN station(s), select a Web (HTTP) Port number that is greater than 1024. In this example, you choose 8100.

- Step 2** Type *8100* in the **Web (HTTP) Server Port** text box.

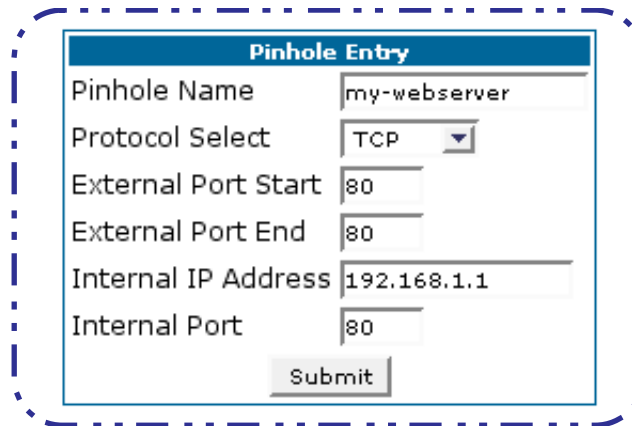
Step 3

Internal Servers	
Enter a value from 1 to 65534	
Web (HTTP) Server Port	<input type="text" value="8100"/>
Telnet Server Port	<input type="text" value="23"/>
<input type="button" value="Submit"/>	

- Step 4** Click the *Submit* button.

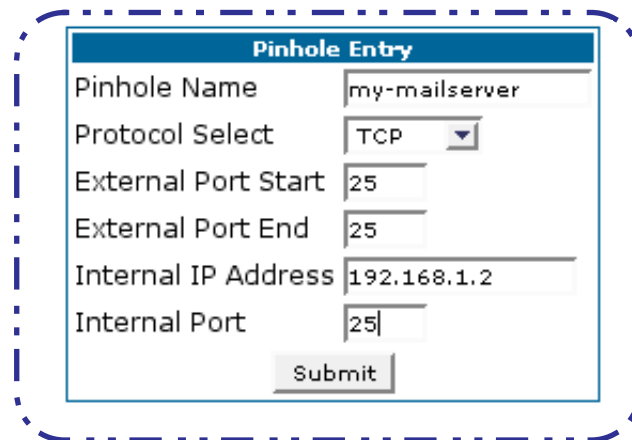
- Step 5** Click *Advanced*. Select the *Pinholes* link to go to the Pinhole page.

- Step 6** Click **Add**. Type your specific data into the Pinhole Entries table of this page. Click **Submit**.



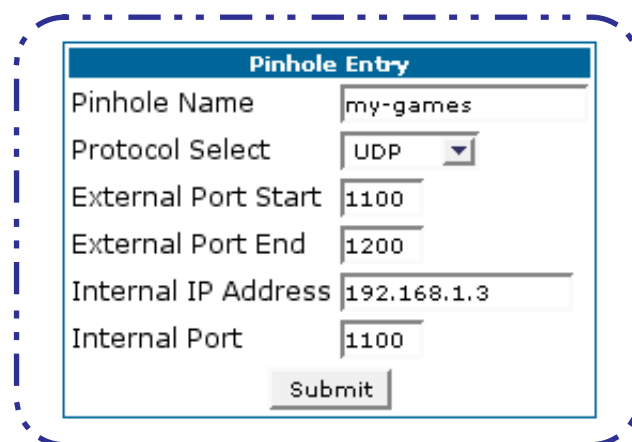
The screenshot shows a web form titled "Pinhole Entry" enclosed in a dashed blue border. The form contains the following fields: "Pinhole Name" with the value "my-webserver", "Protocol Select" with a dropdown menu showing "TCP", "External Port Start" with the value "80", "External Port End" with the value "80", "Internal IP Address" with the value "192.168.1.1", and "Internal Port" with the value "80". A "Submit" button is located at the bottom right of the form.

- Step 7** Click on the **Pinholes** link in the Breadcrumb Trail to go to the Pinholes entry page. Click **Add**. Add the next Pinhole. Type the specific data for the second Pinhole.



The screenshot shows a web form titled "Pinhole Entry" enclosed in a dashed blue border. The form contains the following fields: "Pinhole Name" with the value "my-mailserver", "Protocol Select" with a dropdown menu showing "TCP", "External Port Start" with the value "25", "External Port End" with the value "25", "Internal IP Address" with the value "192.168.1.2", and "Internal Port" with the value "25". A "Submit" button is located at the bottom right of the form.

- Step 8** Click on the **Pinholes** link in the Breadcrumb Trail to go to the Pinholes entry page. Click the **Add**. Add the next Pinhole. Type the specific data for the third Pinhole.



The screenshot shows a web form titled "Pinhole Entry" enclosed in a dashed blue border. The form contains the following fields: "Pinhole Name" with the value "my-games", "Protocol Select" with a dropdown menu showing "UDP", "External Port Start" with the value "1100", "External Port End" with the value "1200", "Internal IP Address" with the value "192.168.1.3", and "Internal Port" with the value "1100". A "Submit" button is located at the bottom right of the form.



Note the following parameters for the “my-games” Pinhole:

1. The Protocol ID is UDP.
2. The external port is specified as a range.
3. The Internal port is specified as the lower range entry.

Step 9 Click on the *Pinholes* link in the Breadcrumb Trail to go to the Pinholes entry page. Review your entries to be sure they are correct.

To create a new pinhole entry, press the “Add” button.
To edit or delete a pinhole entry, select the entry and press the “Edit” or “Delete” button.

Pinholes			
Name-my-webserver	Protocol-TCP	InsideIPAddr-192.168.001.001	
Name-mt-mailserver	Protocol-TCP	InsideIPAddr-192.168.001.002	
Name-my-games	Protocol-UDP	InsideIPAddr-192.168.001.003	
<div>Add Edit Delete</div>			

Step 10 Click the *Alert* button.

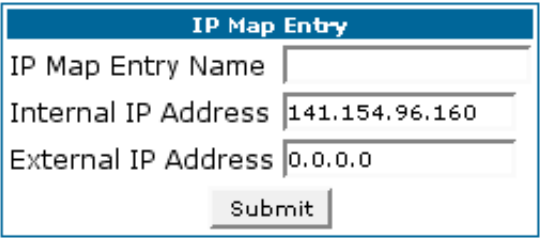
Step 11 Select the *Save and Restart* link to complete the entire Pinhole creation task and ensure that the parameters are properly saved.



REMEMBER: When you have re-assigned the port address for the embedded Web server, you can still access this facility. Use the Gateway’s WAN address plus the new port number. In this example it would be
<WAN Gateway address>:<new port number> or, in this case,
210.219.41.20:8100

[Link](#)[IPMaps](#)

Response



The screenshot shows a web form titled "IP Map Entry". It contains three input fields: "IP Map Entry Name" (empty), "Internal IP Address" (containing "141.154.96.160"), and "External IP Address" (containing "0.0.0.0"). Below these fields is a "Submit" button. The entire form is enclosed in a dashed blue border.

Comment

IPMaps supports one-to-one Network Address Translation (NAT) for IP addresses assigned to servers, hosts, or specific computers on the LAN side of the Cayman Gateway.

A single static or dynamic (DHCP) WAN IP address must be assigned to support other devices on the LAN. These devices utilize Cayman's default NAT/PAT capabilities.

Configure the IPMaps Feature

HOW
TO

FAQs for the IPMaps Feature

Before configuring an example of an IPMaps-enabled network, review these frequently asked questions.

What are IPMaps and how are they used?

The IPMaps feature allows multiple static WAN IP addresses to be assigned to the Cayman Gateway.

Static WAN IP addresses are used to support specific services, like a web server, mail server, or DNS server. This is accomplished by mapping a separate static WAN IP address to a specific internal LAN IP address. All traffic arriving at the Gateway intended for the static IP address is transferred to the internal device. All outbound traffic from the internal device appears to originate from the static IP address.

Locally hosted servers are supported by a public IP address while LAN users behind the NAT-enabled IP address are protected.

IPMaps is compatible with the use of NAT, with either a statically assigned IP address or DHCP/PPP served IP address for the NAT table.

What types of servers are supported by IPMaps?

IPMaps allows a Cayman Gateway to support servers behind the Gateway, for example, web, mail, FTP, or DNS servers. VPN servers are not supported at this time.

Can I use IPMaps with my PPPoE or PPPoA connection?

Yes. IPMaps can be assigned to the WAN interface **provided they are on the same subnet**. Service providers will need to ensure proper routing to all IP addresses assigned to your WAN interface.

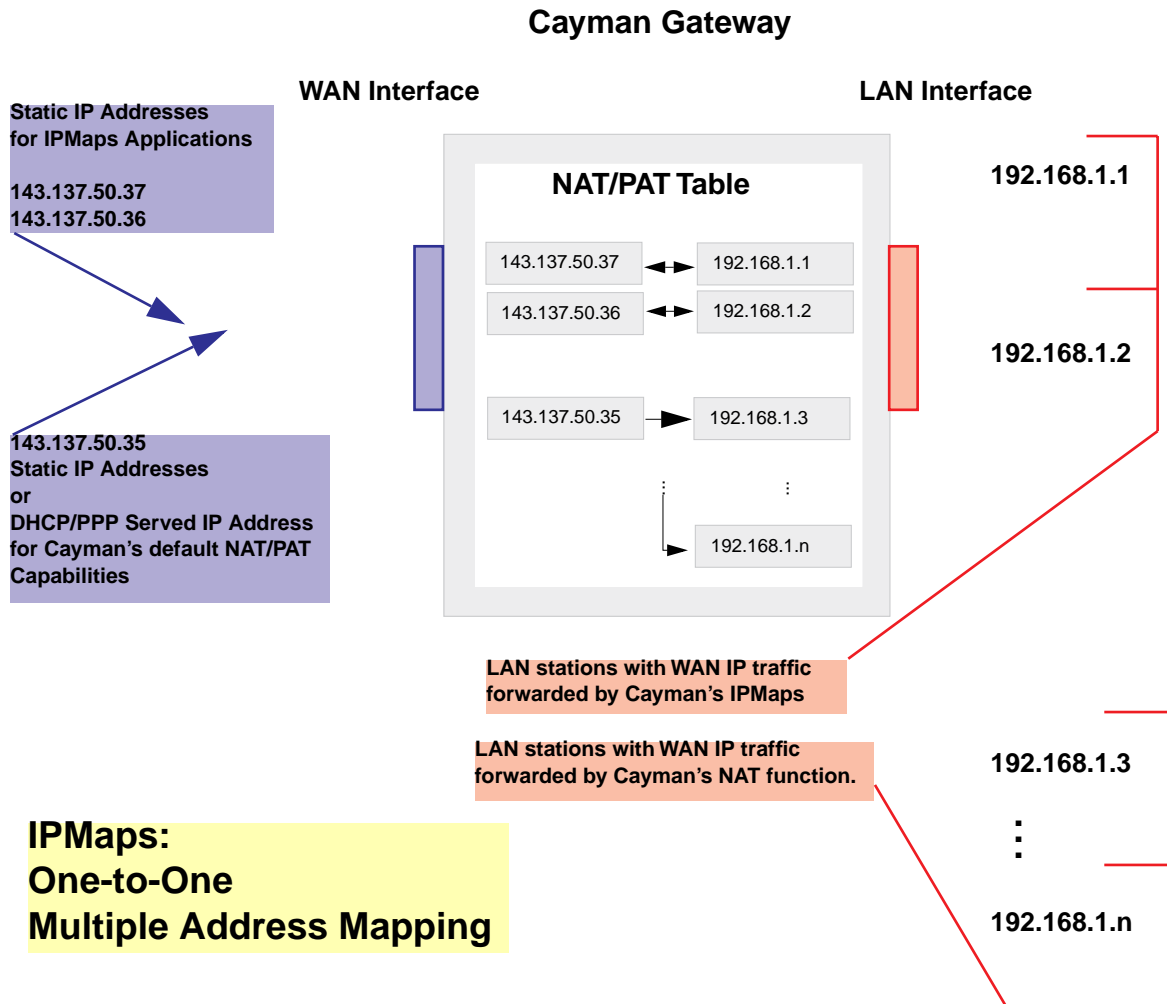
Will IPMaps allow IP addresses from different subnets to be assigned to my Gateway?

IPMap will support statically assigned WAN IP addresses from the same subnet.

WAN IP addresses from different subnets are not supported.

IPMaps Block Diagram

The following diagram shows the IPMaps principle in conjunction with existing Cayman NAT operations:



[Link](#)

Protocol Lifetimes

Response

Protocol Lifetimes	
UDP	<input type="text" value="6"/>
TCP	<input type="text" value="480"/>
ICMP	<input type="text" value="6"/>
FTP	<input type="text" value="8"/>
PPTP	<input type="text" value="8"/>
ESP	<input type="text" value="60"/>
IKE	<input type="text" value="60"/>
Other	<input type="text" value="5"/>
<input type="button" value="Submit"/>	

Description

Each NAT Protocol map entry will time-out if there is no traffic of that protocol for the specified number of minutes. For example, UDP entries time-out if there is no UDP traffic after 6 (default) minutes.

[Link](#)

Default Server

Response

Default Server	
Enable Default Server	<input checked="" type="checkbox"/>
NAT Server IP Address	<input type="text" value="0.0.0.0"/>
<input type="button" value="Submit"/>	

Description

This feature allows you to:

- * Direct your Gateway to forward all externally initiated IP traffic (TCP and UDP protocols only) to a default host on the LAN.
- * Enable it for certain situations:
 - Where you cannot anticipate what port number or packet protocol an in-bound application might use. For example, some network games select arbitrary port numbers when a connection is opened.
 - When you want all unsolicited traffic to go to a specific LAN host.

Configure a Default Server

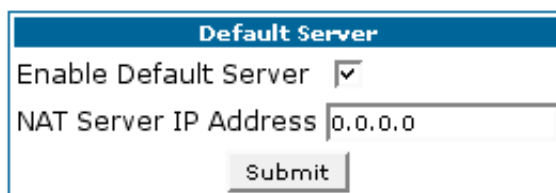
HOW TO

This feature allows you to direct unsolicited or non-specific traffic to a designated LAN station. With NAT "On" in the Gateway, these packets normally would be discarded.

For instance, this could be application traffic where you don't know (in advance) the port or protocol that will be utilized. Some game applications fit this profile.

Use the following steps to setup a NAT default server to receive this information:

- Step 1** Select the *Configure* toolbar button, then *Advanced*, then the *Default Server* link.
- Step 2** Check the *Enable Default Server* checkbox. The NAT Server IP Address field appears.



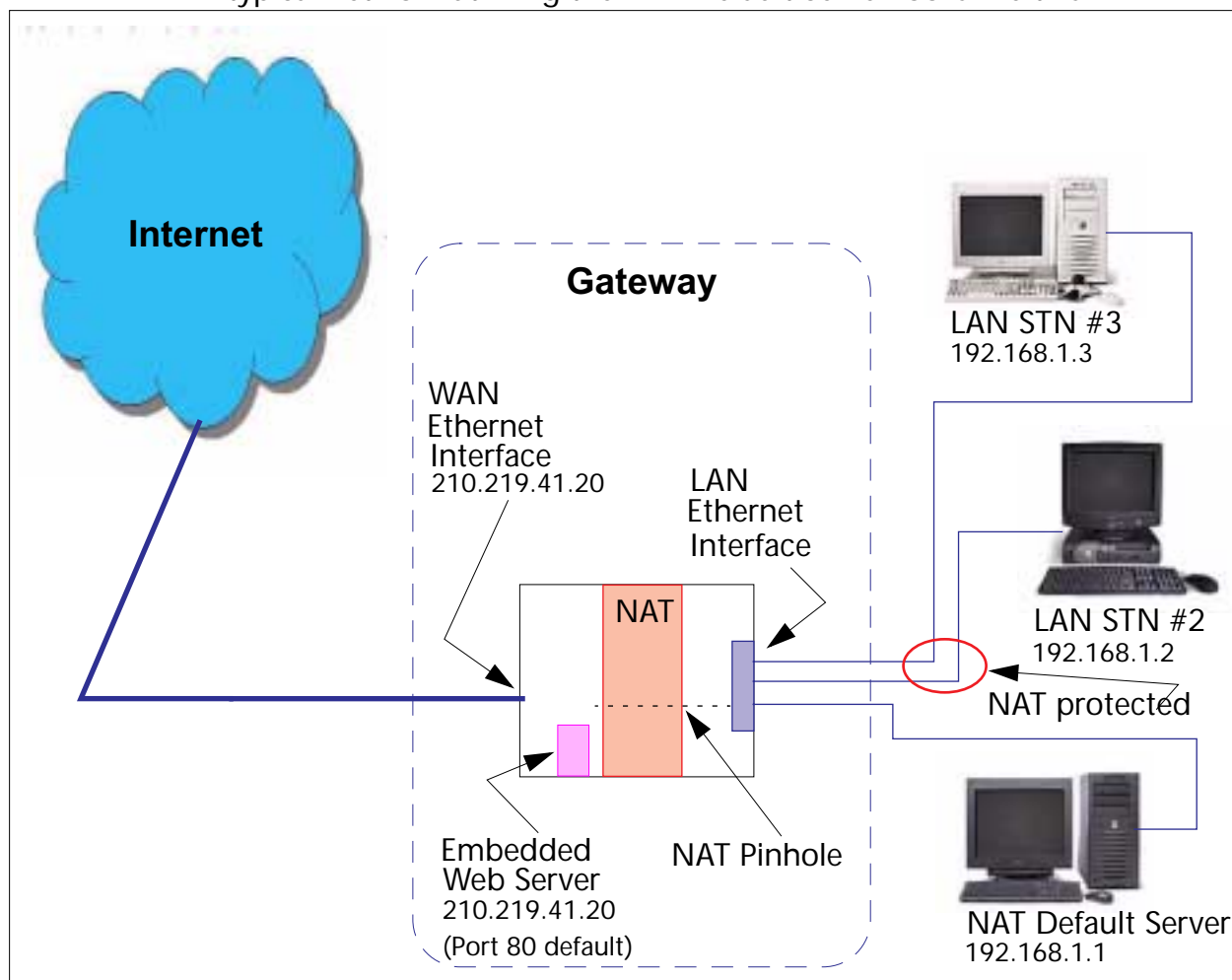
- Step 3** Determine the IP address of the LAN computer you have chosen to receive the unexpected or unknown traffic. Enter this address in the NAT Server IP Address field.
- Step 4** Click the *Submit* button.
- Step 5** Click the *Alert* button.
- Step 6** Click the *Save and Restart* link to confirm.



NAT Default Server capability is not available over SafeHarbour IPsec.

Typical Network Diagram

A typical network utilizing the NAT Default Server looks like this:



NAT Combination Application

Cayman's NAT security feature allows you to configure a sophisticated LAN layout that uses both the Pinhole and Default Server capabilities.

With this topology, you configure the embedded administration ports as a first task, followed by the Pinholes and, finally, the NAT Default Server.

When using both NAT pinholes and NAT Default Server the Gateway works with the following rules (in sequence) to forward traffic from the Internet to the LAN:

1. If the packet is a response to an existing connection created by outbound traffic from a LAN PC, forward to that station.
2. If not, check for a match with a pinhole configuration and, if one is found, forward the packet according to the pinhole rule.
3. If there's no pinhole, the packet is forwarded to the Default Server.

[Link](#)[DNS](#)**Response**

If your service provider hosts a Domain Name Server, you may enter the domain name and IP address associated with the server here. The Primary DNS Server Address must be 0.0.0.0 if your network provides DNS information via DHCP.

DNS	
Domain Name	<input type="text"/>
Primary DNS Server Address	<input type="text" value="0.0.0.0"/>
Secondary DNS Server Address	<input type="text" value="0.0.0.0"/>
<input type="button" value="Submit"/>	

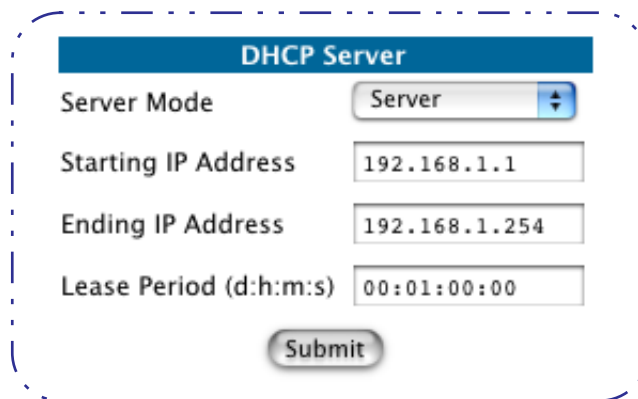
Description

Your Service Provider may maintain a Domain Name server. If you have the information for the DNS servers, enter it on the DNS page. If your Gateway is configured to use DHCP to obtain its WAN IP address, the DNS information is automatically obtained from that same DHCP Server.

[Link](#)

DHCP Server

Response



DHCP Server	
Server Mode	Server
Starting IP Address	192.168.1.1
Ending IP Address	192.168.1.254
Lease Period (d:h:m:s)	00:01:00:00
Submit	

Description

Your Gateway can provide network configuration information to computers on your LAN, using the Dynamic Host Configuration Protocol (DHCP).

If you already have a DHCP server on your LAN, you should turn this service off.

If you want the Gateway to provide this service, click the **Server Mode** pulldown menu, then configure the range of IP addresses that you would like the Gateway to hand out to your computers.

You can also specify the length of time the computers can use the configuration information; DHCP calls this period the lease time.

Your Service Provider may, for certain services, want to provide configuration from its DHCP servers to the computers on your LANs. In this case, the Gateway will relay the DHCP requests from your computers to a DHCP server in the Service Provider's network.

Click the relay-agent and enter the IP address of the Service Provider's DHCP server in the Server Address field. This address is furnished by the Service Provider.

[Link](#)**SNMP****Response**

The screenshot displays the SNMP configuration interface within a dashed blue border. It contains three main sections:

- Communities:** A section with a text input field and an "Add" button.
- Authentication Traps:** A section with a header "Authentication Traps", a checkbox "Enable Authentication Traps" (which is unchecked), and a table.

Destination IP Address	Community Name	Action
0.0.0.0		Add
- System Group:** A section with two text input fields labeled "System Contact" and "System Location", and a "Submit" button.

Description

The Simple Network Management Protocol (SNMP) lets a network administrator monitor problems on a network by retrieving settings on remote network devices. The network administrator typically runs an SNMP management station program on a local host to obtain information from an SNMP agent. In this case, the Cayman Gateway is an SNMP agent.

You enter SNMP configuration information on this page.

Your network administrator furnishes the SNMP parameters.



SNMP presents you with a security issue. The community facility of SNMP behaves somewhat like a password. The community "**public**" is a well-known community name. It could be used to examine the configuration of your Gateway by your service provider or an uninvited reviewer. While Cayman's SNMP implementation does not allow changes to the configuration, the information can be read from the Gateway.

If you are strongly concerned about security, you may delete the "public" community.

[Link](#)

Ethernet Bridge

Response

Ethernet Bridge	
Enable Bridging Function	Always On
Enable WAN-to-WAN Bridging	<input type="checkbox"/>
Ethernet 10BT (LAN)	
Enable Bridging on Port	Always On
Ethernet Wireless (LAN)	
Enable Bridging on Port	Always On
PPP over Ethernet vcc1 (WAN)	
Enable Bridging on Port	<input type="checkbox"/>
<input type="button" value="Submit"/>	

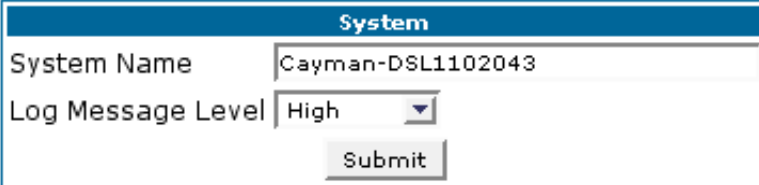
Description

Bridges let you join two local area networks, so that they appear to be part of the same physical network. As a bridge for protocols other than TCP/IP, your Gateway keeps track of as many as 255 MAC (Media Access Control) addresses, each of which uniquely identifies an individual host on a network. Your Gateway uses this bridging table to identify which hosts are accessible through which of its network interfaces. The bridging table contains the MAC address of each packet it sees, along with the interface over which it received the packet. Over time, the Gateway learns which hosts are available through its WAN port, its LAN port, and/or its wireless interface.

[Link](#)

System

Response



The screenshot shows a web form titled "System". It contains two input fields: "System Name" with the value "Cayman-DSL1102043" and "Log Message Level" with a dropdown menu set to "High". A "Submit" button is located at the bottom right of the form.

Description

The **System Name** defaults to your Gateway's factory identifier combined with its serial number. Some cable-oriented Service Providers use the System Name as an important identification and support parameter. If your Gateway is part of this type of network, do NOT alter the System Name unless specifically instructed by your Service Provider.

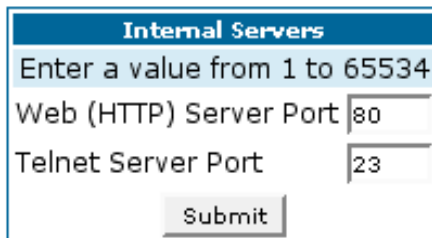
The System Name can be 1-63 characters long; it can include embedded spaces and special characters.

The **Log Message Level** alters the severity at which messages are collected in the Gateway's system log. Do not alter this field unless instructed by your Support representative.

[Link](#)

Internal Servers

Response



Internal Servers	
Enter a value from 1 to 65534	
Web (HTTP) Server Port	80
Telnet Server Port	23
<input type="button" value="Submit"/>	

Description

Your Gateway ships with an embedded Web server and support for a Telnet session, to allow ease of use for configuration and maintenance. The default ports of **80** for HTTP and **23** for Telnet may be reassigned. This is necessary if a pinhole is created to support applications using port 80 or 23. See ["Pinholes" on page 46](#) for more information on Pin-hole configuration.

Web (HTTP) Server Port: To reassign the port number used to access the Cayman embedded Web server, change this value to a value greater than 1024. When you next access the embedded Cayman Web server, append the IP address with <port number>, (e.g. Point your browser to **http://210.219.41.20:8080**)

Telnet Server Port: To reassign the port number used to access your Cayman embedded Telnet server, change this value to a value greater than 1024. When you next access the Cayman embedded Telnet server, append the IP address with <port number>, (e.g. **telnet 210.219.41.20:2323**)

[Link](#)

Ethernet MAC Address Override

Response

Ethernet MAC Address Override	
Enable Override	<input checked="" type="checkbox"/>
MAC Address	<input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/> - <input type="text" value="00"/>
<input type="button" value="Submit"/>	

Description

You can override your Gateway's Ethernet MAC address with any necessary setting. Some ISPs require your account to be identified by the MAC address, among other things. For information on setting this parameter, see ["How to Use the Quickstart Page"](#) on page 36.

[Link](#)

Traffic Shaping

Response

Traffic Shaping	
Enable Traffic Shaping	<input checked="" type="checkbox"/>
Ethernet 10BT (LAN)	
Enable Traffic Shaping on Port	<input checked="" type="checkbox"/>
Rate	<input type="text" value="10000000"/>
<input type="button" value="Submit"/>	

Description

Traffic shaping controls how much traffic can flow through an Ethernet interface by limiting the size of the Ethernet pipe. This function is most suitable for Internet Service Providers.

Enable Traffic Shaping on Port: Each Ethernet port providing traffic shaping capability is listed. Enable the port to set the traffic shaping rate.

Rate: This value, in bits per second, indicates the approximate speed at which traffic will flow.

[Link](#)

[Clear Options](#)

Response

Clear Options

Choosing the 'Clear Options' link below will restore the Gateway's factory configuration. You will be returned to the Restart Page because the Gateway must be restarted in order to complete the process.

[Clear Options](#)

Description

To restore the factory configuration of the Gateway, choose **Clear Options**. You may want to upload your configuration to a file before performing this function.

Comment

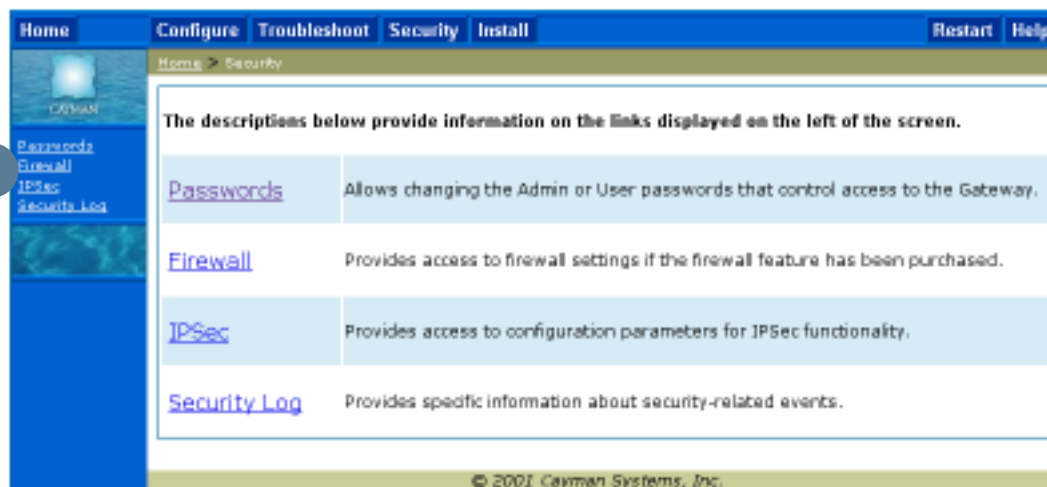
Clear Options does not clear feature keys or affect the software image or BootPROM.

You must restart the Gateway for **Clear Options** to take effect.

Security

Button Security

Response



Description

The Security features are available by clicking on the Security toolbar button. Some items of this category do not appear when you log on as **User**.

Link Passwords

Description

Access to your Gateway is controlled through two user accounts, **Admin** and **User**. When you first power up your Gateway, you create a password for the **Admin** account. The User account does not exist by default. As the Admin, a password for the User account can be entered or existing passwords changed.

Create and Change Passwords

HOW TO

You can establish different levels of access security to protect your Cayman Gateway settings from unauthorized display or modification.

- Admin level privileges let you display and modify all settings in the Cayman Gateway (Read/Write mode). The Admin level password is created when you first access your Gateway.
- User level privileges let you display (but not change) settings of the Cayman Gateway. (Read Only mode)

To prevent anyone from observing the password you enter, characters in the old and new password fields are not displayed as you type them.

To display the Passwords window, click the **Security** toolbar button on the Home page.

About Passwords

Access to your Gateway is controlled through two user accounts, Admin and User.

Admin: Full access to the Gateway

User: Not allowed to configure any parameters, install keys/software, or restart the Gateway

Use the fields below to change or create passwords.

Passwords

Username: Admin

Old Password: (Leave blank if no old password)

New Password:

Confirm Password:

Password changes are automatically saved, and take effect immediately.

Submit

Use the following procedure to change existing passwords or add the User password for your Cayman Gateway:

- Step 1** Select the password type from the **Password Level** pull-down list. Choose from **Admin** or **User**.
- Step 2** If you assigned a password to the Cayman Gateway previously, enter your current password in the **Old Password** field.
- Step 3** Enter your new password in the **New Password** field.
Cayman's rules for a Password are:

- It can have up to eight alphanumeric characters.
- It is case-sensitive.

Step 4 Enter your new password again in the *Confirm Password* field.

You confirm the new password to verify that you entered it correctly the first time.

Step 5 When you are finished, click the *Submit* button to store your modified configuration in the Cayman unit's memory.

Password changes are automatically saved, and take effect immediately.

[Link](#)

[Firewall](#)

[Use a Cayman Firewall](#)



BreakWater Basic Firewall

BreakWater delivers an easily selectable set of pre-configured firewall protection levels. For simple implementation these settings (comprised of three levels) are readily available through Cayman's embedded web server interface.

BreakWater Basic Firewall's three settings are:

ClearSailing

ClearSailing, BreakWater's default setting, supports both inbound and outbound traffic. It is the only basic firewall setting that fully interoperates with all other Cayman software features.

SilentRunning

Using this level of firewall protection allows transmission of outbound traffic on pre-configured TCP/UDP ports. It disables any attempt for inbound traffic to identify the Gateway. This is the Internet equivalent of having an *unlisted number*.

LANdLocked

The third option available turns off all inbound and outbound traffic, isolating the LAN and disabling all WAN traffic.



BreakWater Basic Firewall operates independent of the NAT functionality on the Gateway.

Configuring for a BreakWater Setting

Use these steps to establish a firewall setting:

Step 1 **Ensure that you have enabled the BreakWater basic firewall with the appropriate feature key.**

See ["Use Cayman Software Feature Keys"](#) on page 93 for reference.

Step 2 **Click the *Security* toolbar button.**

Step 3 **Click *Firewall*.**

BreakWater Firewall

ClearSailing	Provides protection against unwanted inbound traffic, while securely passing outbound traffic through the Gateway and allowing authorized connections for remote diagnostic support.
SilentRunning	Using this level of firewall protection allows secure transmission of outbound traffic, but disables any attempt for inbound traffic to identify the Gateway. This is the Internet equivalent of having an unlisted number.
LANdlocked	This option turns off all inbound and outbound traffic, isolating the LAN and disabling all WAN traffic.

BreakWater Option

☒ ClearSailing
☐ SilentRunning
☐ LANdLocked

BreakWater changes are automatically saved, and take effect immediately.

Step 4 Click on the radio button to select the protection level you want. Click *Submit*.

Changing the BreakWater setting does **not** require a restart to take effect. This makes it easy to change the setting "on the fly," as your needs change.



TIPS for making your BreakWater Basic Firewall Selection

Application	Select this Level	Other Considerations
Typical Internet usage (browsing, e-mail)	SilentRunning	
Multi-player online gaming	ClearSailing	Set Pinholes; once defined, pinholes will be active whenever ClearSailing is set. Restore SilentRunning when finished.
Going on vacation	LANdLocked	Protects your connection while your away.
Finished online use for the day	LANdLocked	This protects you instead of disconnecting your Gateway connection.
Chatting online or using instant messaging	ClearSailing	Set Pinholes; once defined, pinholes will be active whenever ClearSailing is set. Restore SilentRunning when finished.

Basic Firewall Background

As a device on the Internet, a Cayman Gateway requires an IP address in order to send or receive traffic.

The IP traffic sent or received have an associated application port which is dependent on the nature of the connection request. In the IP protocol standard the following session types are common applications:

- ICMP
- HTTP
- FTP
- SNMP
- telnet
- DHCP

By receiving a response to a scan from a port or series of ports (which is the expected behavior according to the IP standard), hackers can identify an existing device and gain a potential opening for access to an internet-connected device.

To protect LAN users and their network from these types of attacks, BreakWater offers three levels of increasing protection.

The following tables indicate the state of ports associated with session types, both on the WAN side and the LAN side of the Gateway.

This table shows how inbound traffic is treated. *Inbound* means the traffic is coming from the WAN into the WAN side of the Gateway.

Gateway: WAN Side				
BreakWater Setting >>		ClearSailing	SilentRunning	LANdLocked
Port	Session Type	-----Port State-----		
20	ftp data	Enabled	Disabled	Disabled
21	ftp control	Enabled	Disabled	Disabled
23	telnet external	Enabled	Disabled	Disabled
23	telnet Cayman server	Enabled	Disabled	Disabled
80	http external	Enabled	Disabled	Disabled
80	http Cayman server	Enabled	Disabled	Disabled
67	DHCP client	Enabled	Enabled	Disabled
68	DHCP server	Not Applicable	Not Applicable	Not Applicable
161	snmp	Enabled	Disabled	Disabled
	ping (ICMP)	Enabled	Disabled	Disabled

This table shows how outbound traffic is treated. *Outbound* means the traffic is coming from the LAN-side computers into the LAN side of the Gateway.

Gateway: LAN Side				
BreakWater Setting >>		ClearSailing	SilentRunning	LANdLocked
Port	Session Type	-----Port State-----		
20	ftp data	Enabled	Enabled	Disabled
21	ftp control	Enabled	Enabled	Disabled
23	telnet external	Enabled	Enabled	Disabled
23	telnet Cayman server	Enabled	Enabled	Enabled
80	http external	Enabled	Enabled	Disabled
80	http Cayman server	Enabled	Enabled	Enabled
67	DHCP client	Not Applicable	Not Applicable	Not Applicable
68	DHCP server	Enabled	Enabled	Enabled
161	snmp	Enabled	Enabled	Enabled
	ping (ICMP)	Enabled	Enabled	WAN - Disabled LAN - Local Address Only



The Gateway's WAN DHCP client port in SilentRunning mode is enabled. This feature allows end users to continue using DHCP-served IP addresses from their Service Providers, while having no identifiable presence on the Internet.

[Link](#)

IPSec

Response

Two separate mechanisms for IPSec tunnel support are provided by your Gateway:

- **IPSec PassThrough** supports VPN clients running on LAN-connected computers. Disable this checkbox if your LAN-side VPN client includes its own NAT interoperability solution.
- **SafeHarbour** is a keyed feature that enables Gateway-terminated VPN support.

IPSec PassThrough
 Enable IPSec PassThrough ☒

SafeHarbour IPSec
 Enable SafeHarbour IPSec ☐

Submit

Description

Your Gateway supports two mechanisms for IPSec tunnels:

1. **IPSec PassThrough** supports Virtual Private Network (VPN) clients running on LAN-connected computers. Normally, this feature is enabled. However, you can disable it if your LAN-side VPN client includes its own NAT interoperability option.
2. **SafeHarbour VPN IPSec** is a keyed feature that enables Gateway-terminated VPN support.

Configure a SafeHarbour VPN

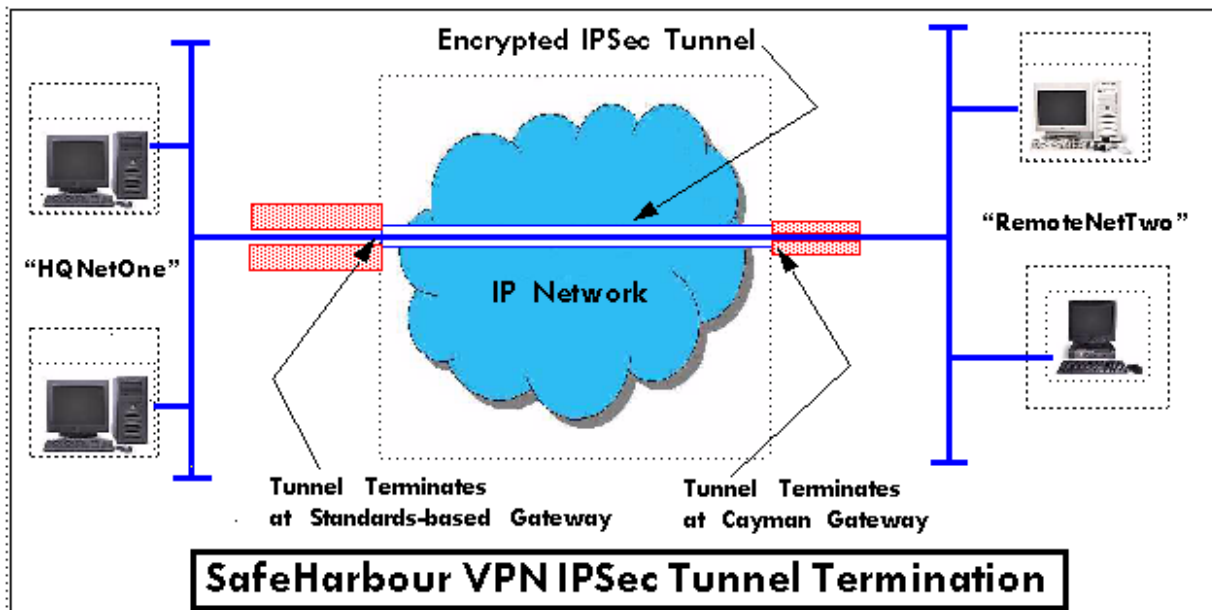
HOW TO

VPN IPSec Tunnel at the Gateway

SafeHarbour VPN IPSec Tunnel provides a single, encrypted tunnel to be terminated on the Gateway, making a secure tunnel available for all LAN- connected Users. This implementation offers the following:

- Eliminates the need for VPN client software on individual PC's.
- Reduces the complexity of tunnel configuration.
- Simplifies the ongoing maintenance for secure remote access.

A typical SafeHarbour configuration is shown below:



Use these Best Practices in establishing your SafeHarbour tunnel.



1. Ensure that the configuration information is complete and accurate
2. Use the Worksheet provided on [page 76](#).

Parameter Description and Setup

The following table describes SafeHarbour's parameters that are used for an IPSec VPN tunnel configuration:

Auth Protocol	Authentication Protocol for IP packet header. The three parameter values are None, Encapsulating Security Payload (ESP) and Authentication Header (AH)
DH Group	Diffie-Hellman is a public key algorithm used between two systems to determine and deliver secret keys used for encryption. Groups 1, 2 and 5 are supported.
Enable	This toggle button is used to enable/disable the configured tunnel.
Encrypt Protocol	Encryption protocol for the tunnel session. Parameter values supported include NONE or ESP.
Hard MBytes	Setting the Hard MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard MByte value. The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed.
Hard Seconds	Setting the Hard Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Hard Seconds value. The value can be configured between 60 and 1,000,000 seconds
Key Management	The Key Management algorithm manages the exchange of security keys in the IPSec protocol architecture. SafeHarbour supports the standard Internet Key Exchange (IKE)
Peer External IP Address	The Peer External IP Address is the public, or routable IP address of the remote gateway or VPN server you are establishing the tunnel with.
Peer Internal IP Network	The Peer Internal IP Network is the private, or Local Area Network (LAN) address of the remote gateway or VPN Server you are communicating with.

Peer Internal IP Netmask	The Peer Internal IP Netmask is the subnet mask of the Peer Internal IP Network.
PFS DH Group	Perfect Forward Secrecy (PFS) is used during SA renegotiation. When PFS is selected, a Diffie-Hellman key exchange is required. SafeHarbour supports PFS DH Groups 1, 2 and 5.
Pre-Shared Key	The Pre-Shared Key is a parameter used for authenticating each side. The value can be an ASCII or Hex and a maximum of 64 characters. ASCII is case-sensitive.
Pre-Shared Key Type	The Pre-Shared Key Type classifies the Pre-Shared Key. SafeHarbour supports ASCII or HEX types
Name	The Name parameter refers to the name of the configured tunnel. This is mainly used as an identifier for the administrator. The Name parameter is an ASCII value and is limited to 31 characters. <u>The tunnel name is the only IPSec parameter that does not need to match the peer gateway.</u>
Negotiation Method	This parameter refers to the method used during the Phase I key exchange, or IKE process. SafeHarbour supports Main or Aggressive Mode. Main mode requires 3 two-way message exchanges while Aggressive mode only requires 3 total message exchanges.
SA Encrypt Type	SA Encryption Type refers to the symmetric encryption type. This encryption algorithm will be used to encrypt each data packet. SA Encryption Type values supported include DES, 3DES, CAST and Blowfish.
SA Hash Type	SA Hash Type refers to the Authentication Hash algorithm used during SA negotiation. Values supported include MD5 and SHA1. N/A will display if NONE is chosen for Auth Protocol.
Soft MBytes	Setting the Soft MBytes parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft MByte value. The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed. If this value is not achieved, the Hard MBytes parameter is enforced.
Soft Seconds	Setting the Soft Seconds parameter forces the renegotiation of the IPSec Security Associations (SAs) at the configured Soft Seconds value. The value can be configured between 60 and 1,000,000 seconds.

IPSec Tunnel Parameter Setup Worksheet

Parameter	Cayman	Peer Gateway
Name		
Peer External IP Address		
Peer Internal IP Network		
Peer Internal IP Netmask		
Enable		
Encrypt Protocol	None	
	ESP	
Auth Protocol	None	
	ESP	
	AH	
Key Management	IKE	
Pre-Shared Key Type	HEX	
	ASCII	
Pre-Shared Key		
Negotiation Method	Main	
	Aggressive	
DH Group	1	
	2	
	5	
SA Encrypt Type	DES	
	3DES	
	CAST	
	Blowfish	
SA Hash Type	N/A	
	MD5	
	SHA1	
PFS DH Group	Off	
	1	
	2	
	5	
Soft MBytes	1 - 1000000	
Soft Seconds	60 - 1000000	
Hard MBytes	1 - 1000000	
Hard Seconds	60 - 1000000	

SafeHarbour Tunnel Setup

Use the following tasks to configure an IPSec VPN tunnel on your Cayman Gateway.

Task 1: Ensure that you have SafeHarbour VPN enabled.

SafeHarbour is a keyed feature. See [page 93](#) for information concerning installing Cayman Software Feature Keys.

Task2: Complete Parameter Setup Worksheet

IPSec tunnel configuration requires precise parameter set between VPN devices. The Setup Worksheet facilitates setup and assures that the associated variables are identical.

Task 3: Enable IPSec

IPSec must be enabled on your Gateway to allow further VPN configuration. Perform the following steps to enable IPSec:

- Step 1** Browse to Gateway.
- Step 2** Click the *Security* toolbar button.
- Step 3** Click the *IPSec* link.
- Step 4** Check the *Enable SafeHarbour IPSec* checkbox.
Checking this box will automatically display the **SafeHarbour IPSec Tunnel Entry** parameters.

Two separate mechanisms for IPSec tunnel support are provided by your Gateway:

- IPSec PassThrough supports VPN clients running on LAN-connected computers. Disable this checkbox if your LAN-side VPN client includes its own NAT interoperability solution.
- SafeHarbour is a keyed feature that enables Gateway-terminated VPN support.

IPSec PassThrough

Enable IPSec PassThrough ☒

SafeHarbour IPSec

Enable SafeHarbour IPSec ☒
 Enable NAT Over Tunnel ☐

SafeHarbour IPSec Tunnel Entry						
On	Name	Peer External IP Address	Encryption Protocol	Authentication Protocol	Key Management	
<input checked="" type="checkbox"/>	<input style="width: 150px;" type="text"/>	<input style="width: 100px;" type="text" value="0.0.0.0"/>	ESP ▾	ESP ▾	IKE ▾	<input type="button" value="Add"/>

Leave the **Enable NAT over Tunnel** choice as **Off** unless your network administrator instructs otherwise.

Task 4: Make the IPSec Tunnel Entries

Enter the initial group of tunnel parameters. Refer to your **Setup Worksheet** and the **Glossary of VPN Terms** as required. Perform the following steps:

Step 1 Enter tunnel **Name**.



This is the only parameter that does not have to be identical to the peer/remote VPN device

Step 2 Enter the **Peer External IP Address**.

Step 3 Select **Encryption Protocol** from the pulldown menu.

Step 4 Select **Authentication Protocol** from the pulldown menu.

Step 5 Select **Key Management** from the pulldown menu.

- Step 6** Ensure that the toggle checkbox *Enable*, which is *On* by default, remains On.
- Step 7** Click *Add*.
The Tunnel Details page appears.

Tunnel Details	
Name	telework
Peer Internal Network	0.0.0.0
Peer Internal Netmask	255.255.255.0
Negotiation Method	Main
Pre-Shared Key Type	Hex
Pre-Shared Key	
DH Group	1
PFS DH Group	Off
SA Encrypt Type	DES
SA Hash Type	MD5
Soft MBytes	1000
Soft Seconds	82800
Hard MBytes	1200
Hard Seconds	86400
<input type="button" value="Update"/> <input type="button" value="Delete"/>	

Task 5: Make the Tunnel Details entries

Use the following steps:

- Step 1** Enter or select the required settings.
- Step 2** Click *Update*. The *Alert* button appears.
- Step 3** Click the *Alert* button.
- Step 4** Click *Save and Restart*.



Your SafeHarbour IPSec VPN tunnel is fully configured.
Tunnel sessions can **only** be initiated from the LAN client side.

[Link](#)

Security Log

Response

Security Monitor Log	Show	Reset
Security Statistics	Firewall	SafeHarbor

Description

Security Monitoring detects security-related events, including common types of malicious attacks, and writes them to the security log file.

Using the Security Monitoring Log

HOW TO

You can view the Security Log at any time. Use the following steps:

- Step 1** Click the **Security toolbar button**.
- Step 2** Click the **Security Log link**.
- Step 3** Click the **Show link from the Security Log tool bar**.
An example of the Security Log is shown on the next page.
- Step 4** When a new security event is detected, you will see the **Alert button**.
The Security Alert remains until you view the information. Clicking the Alert button will take you directly to a page showing the log.

Your Cayman Gateway has detected and successfully blocked an event that could have compromised the security of your network.
Please refer to your customer documentation for a description of the logged event.

```

Number of security log entries      : 5

Security alert type                  : Port Scan
Protocol type                       : TCP
IP source address                   : 143.137.137.14
Time at last attempt                : Fri May 04 15:17:40 2001(UTC)
Number of ports that were scanned: 9
Highest port                       : 1167
Lowest port                        : 1094
1102 1108 1094 1099 1166 1167 1151 1160 1164

Security alert type                  : Excessive Pings
IP source address                   : 143.137.137.92
IP destination address              : 143.137.199.8
Number of attempts                  : 98
Time at last attempt                : Fri May 04 17:52:22 2001(UTC)

Security alert type                  : Port Scan
Protocol type                       : TCP
IP source address                   : 143.137.50.2
Time at last attempt                : Fri May 04 17:51:37 2001(UTC)
Number of ports that were scanned: 241
Highest port                       : 5302
Lowest port                        : 73
111 473 682 863 817 1444 885 395 5302 1670
(Only the first 10 ports are recorded.)

Security alert type                  : Port Scan
Protocol type                       : UDP
IP source address                   : 143.137.50.2
Time at last attempt                : Fri May 04 17:52:43 2001(UTC)
Number of ports that were scanned: 162
Highest port                       : 5236
Lowest port                        : 1
583 1 1471 444 4133 811 5236 650 776 1492
(Only the first 10 ports are recorded.)

Security alert type                  : Illegal Packet Size (Ping of Death)
IP source address                   : 192.168.1.3
IP destination address              : 143.137.199.8
Number of attempts                  : 5
Time at last attempt                : Fri May 04 18:05:33 2001(UTC)
Illegal packet size                 : 65740

```

The capacity of the security log is 100 security alert messages. When the log reaches capacity, subsequent messages are not captured, but they are noted in the log entry count.



Remember that the “time stamp” is Universal Coordinated Time (UTC) which is the equivalent of Greenwich Mean Time.
For your convenience, the table below lists the time offsets for various North American time zones.
See *Timestamp Background* information on the next page for more details.

Table of Time Offsets (in hours) from GMT

Zone ->	Hawaii	Alaska	Pacific	Mountain	Central	Eastern	Atlantic	UTC/GMT
Standard Time	-10	-9	-8	-7	-6	-5	-4	0
Daylight Savings Time	N/A	-8	-7	-6	-5	-4	-3	0

Take the recorded UTC/GMT value and subtract the offset value to get the time that an event occurred in your system.

To reset this log, select **Reset** from the Security Monitor tool bar.

The following message is displayed.

The security log has been reset.

When the Security Log contains no entries, this is the response

The security log is empty.

Timestamp Background

During bootup, to provide better log information and to support improved troubleshooting, a Cayman Gateway acquires the National Institute of Standards and Technology (NIST) Universal Coordinated Time (UTC) reference signal.

Once per hour, the Gateway attempts to re-acquire the NIST reference, for re-synchronization or initial acquisition of the UTC information. Once acquired, all subsequent log entries display this date and time information. UTC provides the equivalent of Greenwich Mean Time (GMT) information.

If the WAN connection is not enabled, the internal clocking function of the Gateway provides log timestamps based on “uptime” of the unit.

Install

Button

Install

Response

The descriptions below provide information on the links displayed on the left of the screen.

Install
Keys

Installation page for software keys. These allow additional features to run on the Gateway. A [list of features](#) available for the Gateway can be viewed from the System Status page.

Install
Software

Installation page for upgrading the operating system software.

Description

From the **Install** toolbar button you can:

- Install new Operating System Software
- Install new Feature Keys

Install Software

[Link](#)

Install Software

Response

Install Operating System Software

Browse your computer to find the system software file, or type in the full path and filename. Next, to install the file on your Gateway, click the 'Install Software' button.

The latest releases are available online at Cayman's website: www.cayman.com.

The install may take a few minutes. After the install has completed, restart your Gateway to run the new software.

Browse...

Install Software

Comment

This page allows you to install an updated release of the Cayman Operating System (COS).

Updating Your Gateway to COS Version 6.3

Cayman Operating System Release 6.3 represents significantly expanded functionality for your Cayman Gateway. To deliver these important features, the COS 6.3 image is larger than earlier versions and the updating process is different from earlier procedures. It requires careful attention to the instruction sequence.

Using the Web Page

You install a new operating system image in your unit from the Cayman embedded Web server's Home page. For this process, the computer you are using to connect to the Cayman Gateway must be on the same local area network as the Cayman Gateway.

Required Tasks

Task #	Description	Page #
1	Locate and confirm the required files.	86
2	Install and verify the Updater application code.	87
3	Install and verify the COS 6.3 image.	89



Depending on your particular subscriber agreement, you may need to install other feature key files.

Warnings:



COS 6.3 is **NOT SUPPORTED** on the following models:
2E with PID of 06xx
2E or 2E-H with internal memory of 2MBytes or less



COS 6.3 provides substantial new flexibility and functionality for your Cayman Gateway. However, once you have upgraded to this version, you **cannot revert back** to a previous release.

Task 1 Required Files

Upgrading to COS 6.3 requires **THREE** files:

1. Documentation - *Software Upgrade Instructions* PDF file
2. Updater file
3. Cayman Operating System image

Background

When you downloaded your operating system upgrade from the Cayman website you downloaded a ZIP file containing these files:

- *Software Upgrade Instructions* PDF file (the document you are reading now)
- Updater file for your particular Gateway
- Cayman Operating System image for your particular Gateway

Confirm Updater and COS Image Files

The Updater and COS Image files are specific to the model and the product identification (PID) number.

- Step 1** Confirm that you have received the appropriate Updater and COS Image files using this table:

Model	PID	Updater File	COS 6.3.0R0 Image
3220-H	07xx	u8a110R0.COS	c8a630R0.COS
3220-H	08xx	u8j110R0.COS	c8j630R0.COS
3220-H-W11	08xx	u8w110R0.COS	c8w630R0.COS
3220-H-WRF	08xx	u8w110R0.COS	c8w630R0.COS
2E {see Warnings }	07xx	u8e110R0.COS	c8e630R0.COS
2E-H {see Warnings }	07xx	u8e110R0.COS	c8e630R0.COS
2E-H-W11	09xx	u8ew110R0.COS	c8ew630R0.COS
2E-H-WRF	09xx	u8ew110R0.COS	c8ew630R0.COS

- Step 2** Copy the confirmed Updater file to a convenient location on a computer on your local area network. Be sure that you note the location.

- Step 3** Copy the confirmed COS 6.3 file to the same location.

Contact Information

Contact Cayman Technical Support for questions concerning the upgrade process.

Contact Cayman Sales for specific advanced features.

Use this contact information:

Web Access	http://www.netopia.com/support
Technical Support	510-814-5000 ext 1
Main Telephone	510-814-5100

Task 2 Updater File

Install Updater Application Code

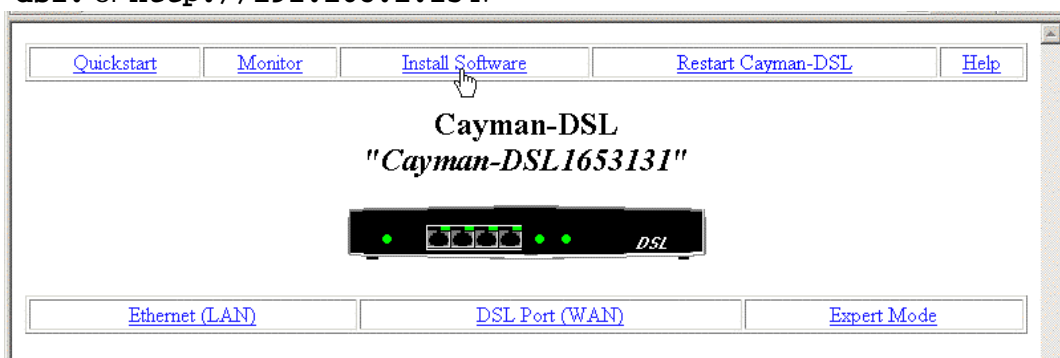


If you are currently running a Cayman Operating System version COS 5.90 or higher, **skip** this Task and continue to page 89 for **Task 3**.

Use these steps to install the Updater software in your Gateway from the Home page:

Step 1 Open a web connection to your Gateway from a LAN computer.

From a web browser access the URL <http://cayman-2E>. or <http://cayman-dsl>. or <http://192.168.1.254>.



This Home page is from a Cayman 3220-H Gateway (DSL WAN access).

The Home page for a Cayman 2E-H Gateway (Ethernet WAN access) is similar.

Step 2 If necessary, save the LAN configuration settings on your Cayman Gateway.

If you have not previously saved your configuration (that is, if you are running the factory default configuration your Cayman Gateway came with), click the

Ethernet button on the Cayman Gateway Home page. When the Ethernet window appears, click **Save**.

If you have previously saved your Cayman Gateway configuration, you can skip this step.

- Step 3** Click the **Install Software** button on the Cayman Gateway Home page. The Install New Cayman Software window opens.



- Step 4** Enter the Updater filename into the text window with one of these techniques:

The Updater file name starts with the letter “u” (for “Updater”).

- a. Click the **Browse** button, select the file you want, and click **Open**.

-or-

- b. Enter the name and path of the update file you want to install in the text field.

- Step 5** Click the **Install** button.

The Cayman Gateway copies the Updater file from your computer and installs it into its memory storage. You see a series of dots appear on your screen as the image is copied and installed. You have the following visual guide from your unit:

3220-H	DSL and Status LED indicators will blink.
2E-H	WAN LED indicator will blink.

When the image has been installed, the message “successful install of file” appears at the bottom of the screen.

- Step 6** When the “Please Click Restart” message appears, click the **Restart** button and confirm **Restart**.

Your Cayman Gateway restarts with its new image. During this step you have the following visual guide from your unit:

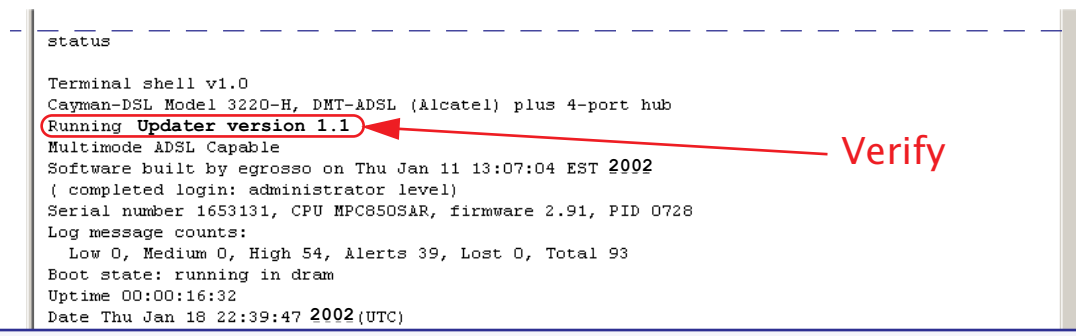
3220-H	DSL and Status LED indicators will blink for 30 seconds or more.
2E-H	WAN LED indicator will blink for 30 seconds or more.

Verify Updater Application Code

To verify that the Updater image has loaded successfully, use the following steps:

Step 7 Open a web connection to your Cayman Gateway from the computer on your LAN; return to the Home page and select the *Monitor* button.

Step 8 Under the General toolbar, select the *Overview* link.



```

status

Terminal shell v1.0
Cayman-DSL Model 3220-H, DMT-ADSL (Alcatel) plus 4-port hub
Running Updater version 1.1
Multimode ADSL Capable
Software built by egrosso on Thu Jan 11 13:07:04 EST 2002
( completed login: administrator level)
Serial number 1653131, CPU MPC850SAR, firmware 2.91, PID 0728
Log message counts:
  Low 0, Medium 0, High 54, Alerts 39, Lost 0, Total 93
Boot state: running in dram
Uptime 00:00:16:32
Date Thu Jan 18 22:39:47 2002(UTC)
  
```

This page is from a Cayman 3220-H Gateway (DSL WAN access).

The page for a Cayman 2E-H Gateway (Ethernet WAN access) is similar.

Step 9 Verify that the Cayman Gateway is running Updater version 1.1.

If the Updater is not running, the screen will show your COS version instead. If your COS version is earlier than 5.9, return to Task 1 and retry the installation.

Task 3 COS 6.3 Image File

Install the COS 6.3 Image

The COS installation process is similar to the Updater installation. To install the COS 6.3 software in your Cayman Gateway from the *Home Page* use the following steps:

Step 1 Open a web connection to your Cayman Gateway from the computer on your LAN.

Step 2 Click the *Install Software* button on the Cayman Gateway *Home* page. The *Install New Cayman Software* window opens.

Step 3 Enter the filename into the text box by using one of these techniques:

The COS file name starts with the letter “c” (for “COS”).

a. Click the Browse button, select the file you want, and click Open.

-or-

b. Enter the name and path of the software image you want to install in the text field and click *Open*.

Step 4 Click the *Install* button.

The Cayman Gateway copies the image file from your computer and installs it into its memory storage. You see a series of dots appear on your screen as the image is copied and installed. You have the following visual guide from your unit:

3220-H	DSL and Status LED indicators will blink.
---------------	---

2E-H	WAN LED indicator will blink.
-------------	-------------------------------

When the image has been installed, the message “successful install of file” appears at the bottom of the screen.

Step 5 When the “Please Click Restart” message appears, click the Restart button and confirm Restart.

Your Cayman Gateway restarts with its new image. During this step you receive the following visual guide from your unit:

3220-H	DSL and Status LED indicators will blink for 30 seconds or more.
---------------	--

2E-H	WAN LED indicator will blink for 30 seconds or more.
-------------	--

Verify the COS 6.3 Image

To verify that the COS 6.3 image has loaded successfully, use the following steps:

- Step 1** Open a web connection to your Cayman Gateway from the computer on your LAN and return to the Home page.



The username **admin** (or *user*) is now a required field for logging onto the web server. In earlier releases, only the password was required.

For COS 6.3 you now have a **new layout**. The screen shown below is from a Cayman 3220-H.

General Information			
Hardware	Cayman-DSL Model 3220-H, DMT-ADSL (Alcatel) plus 4-port hub		
Serial Number	1684761		
Software Version	6.3.0	BreakWater Firewall	ClearSailing
Product ID	0728		
WAN			
Status	Up		
IP Address	141.154.96.172		
Default Gateway	141.154.96.161	Netmask	255.255.255.240
DHCP Client	Off	DHCP Lease Expires	N/A
NAT	Off		
LAN			
IP Address	141.154.96.172		
Netmask	255.255.255.240		
DHCP Server	Off		

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NOTES:

1. Extensive configuration and status information is now available from the Home page.
2. Verify COS 6.3

- Step 2** Verify that your Software Version is COS 6.3.



If your **admin** password is not set, you will be prompted to set it before you reach the Home page.

Welcome to your Cayman-DSL

Before configuration, your Gateway requires a password to protect from unauthorized access. This password is unique to this Gateway. It is case sensitive and should not contain embedded spaces. Remember this password or keep it in a safe place.

After you submit your new password, you must logon before continuing. When you browse to your Gateway as an Administrator, you enter 'Admin' as the UserName and the password you just created in the Logon page.

Admin Password	
New Password	<input type="text"/>
Confirm Password	<input type="text"/>
<input type="submit" value="Submit"/>	



This completes the **UPGRADE** process for COS 6.3.

Install Keys

[Link](#)

Install Keys

Response

Install Key File

Browse your computer to find the feature key file, or type in the full path and filename.
Next, to install the file on your Gateway, click the 'Install Keys' button.

After the install has completed, restart your Gateway to enable the new features.

Comment

You can obtain advanced product functionality by employing a software **Feature Key**. Software feature keys are specific to a Gateway's serial number. Once the feature key file is installed and the Gateway is restarted, the new feature's functionality becomes enabled.

Use Cayman Software Feature Keys

HOW TO

Background

Cayman Gateway users obtain advanced product functionality by installing a *software feature key*. This concept utilizes a specially constructed and distributed file (referred to as a feature key) to enable additional capability within the unit.

Software feature key properties are:

- Specific to a unit's serial number
 - They will not be accepted on a platform with another serial number.

Once installed, and the Gateway restarted, the new feature's functionality becomes available. This allows full access to configuration, operation, maintenance and administration of the new enhancement.

Software feature keys for COS 6.3 enable these enhancements:

- Security Monitoring Log

- BreakWater Basic Firewall
- BarrierReef Advanced Firewall
- SafeHarbour IPSec Tunnel at the Gateway

Obtaining Software Feature Keys

Contact your Service Provider to acquire a Software Feature Key.

Procedure - Install a New Feature Key File

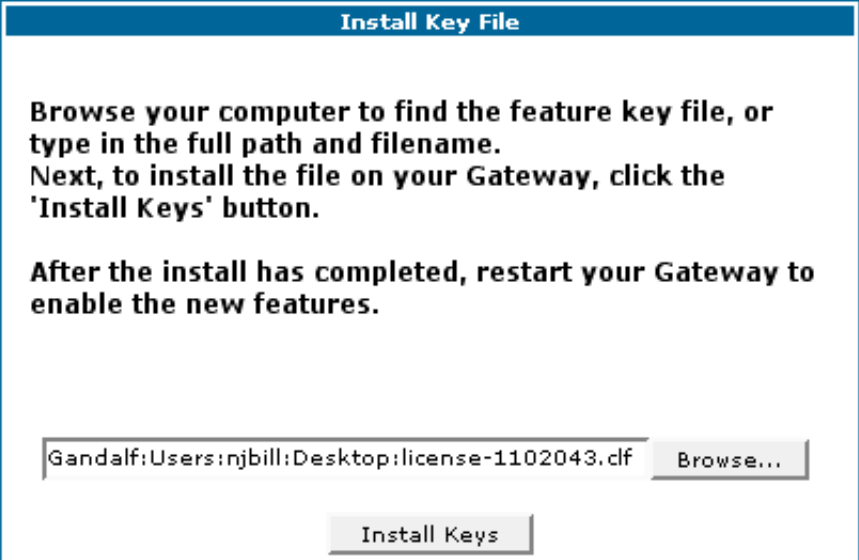
With the appropriate feature key file resident on your LAN PC, use the steps listed below to enable a new function.

Step 1 From the Home page, click the *Install* toolbar button.

Step 2 Click *Install Keys*
The Install Key File page appears.

Step 3 Enter the feature key file name in the input Text Box.

- Browse your drive for the file, or
- Type the full path and file name in the Text Box.



Install Key File

Browse your computer to find the feature key file, or type in the full path and filename.
Next, to install the file on your Gateway, click the 'Install Keys' button.

After the install has completed, restart your Gateway to enable the new features.

Gandalf:Users:njbill:Desktop:license-1102043.cdf

Step 4 Click the *Install Keys* button.

File Installation Success

The file installation was successful. You must restart your Gateway in order for the changes to take effect.

Step 5 Click the *Restart* toolbar button.
The Confirmation screen appears.

Restart Gateway

Restarting the Gateway is needed to enable:

- Changes to your Gateway database configuration
- New feature keys
- Operating System Software Upgrades

When you restart:

- All users will be disconnected
- You will be returned to the Home page
- The Gateway will not respond to your web requests. This inactivity may last for approximately 2 minutes.

[Restart the Gateway](#)

Step 6 Click the *Restart the Gateway* link to confirm.
To check your installed features:

Step 1 Click the *Install* toolbar button.

Step 2 Click the *List of Features* link.

The System Status page appears with the information from the features link displayed below. You can check that the feature you just installed is enabled.

Select an option from the table below:

General	All Status Overview Features Memory
Ports	Ethernet Wireless
IP	Interfaces Routes ARP
Bridge	Interfaces Address Table
System Log	Entire Page by Page Reset
Other	DHCP Client DHCP Server

Available features:

Feature	Mode	Expiration	Notes
Security Monitoring	Keyed	None	
Virtual Private Networking	Disabled		
PPPoE Sessions	Keyed	None	Limit: 8
Concurrent WAN Users	Keyed	None	Unlimited
BreakWater Firewall	Disabled		

Troubleshoot

Button

Troubleshoot

This section provides some specific procedures and tips for working with important features of Cayman OS 6.3.

Perform Troubleshooting on Gateways



There are three major Troubleshooting capabilities you can access via your Cayman Gateway's web interface. The procedures for using them are discussed here. In the event of a problem with your system, your Service Provider may request this information.

Automated Multi-Layer Diagnostics

Step 1 Click the *Troubleshoot* toolbar button.

Step 2 Click the *Diagnostics* link.

The descriptions below provide information on the links displayed on the left of the screen.

System Status	Access to a variety of Gateway information including statistics and the system log.
Network Tools	Specific tools to test connectivity, routes, and perform a NS lookup.
Diagnostics	Troubleshooting utility to test the Gateway.

Step 3 Click the *Run Diagnostics* link.

```

diagnose

==== Checking Ethernet (LAN) Interface
Check Ethernet LAN connect                : PASS
Check IP connect to Ethernet (LAN)        : PASS

==== Checking DSL (WAN) Interfaces
Check DSL Synchronization                 : PASS
Check ATM Cell-Delineation                : PASS
ATM OAM Segment Ping through (vcc1)       : WARNING
*** Don't worry, your service provider may not support this test
ATM OAM End-To-End Ping through (vcc1)    : WARNING
*** Don't worry, your service provider may not support this test
Check Ethernet connect to AAL5 (vcc1)     : PASS
Check PPPOE connect to Ethernet (vcc1)    : PASS
Check PPP connect to PPPOE (vcc1)         : PASS
Check IP connect to PPP (vcc1)            : PASS
Pinging Gateway                           : FAIL

==== Checking Miscellaneous
Check DNS - Query for cayman.com           : PASS
Ping DNS Server Primary IP Address        : PASS
TEST DONE

```

Each test generates one of the following result codes:

CODE	Description
PASS	The test was successful.
FAIL	The test was unsuccessful.
SKIPPED	The test was skipped because a test on which it depended failed, or it was not supported by the service provider equipment to which it is connected.
PENDING	The test timed out without producing a result. Try running the test again.
WARNING	The test was unsuccessful. The Service Provider equipment your Gateway connects to may not support this test.

Network Tools

Use these steps:

Step 1 Click the *Troubleshoot* toolbar button.

Step 2 Click the *Network Tools* link.

Network Test Tools

Enter a host name (such as cayman.com) or an IP address, then click on an option below.

NS Lookup: Converts a host name into IP address or vice versa.
Ping: Sends a ping message to an Internet Host.
TraceRoute: Traces the path to an Internet Host.

Network Host

Host:

NSLookup Ping TraceRoute

Three test tools are available from this page.

- [NSLookup](#) - converts a domain name to its IP address and vice versa.
- [Ping](#) - tests the “reachability” of a particular network destination by sending an ICMP echo request and waiting for a reply.
- [TraceRoute](#) - displays the path to a destination by showing the number of hops and the router addresses of these hops.

Step 3 To use the Ping capability, type a destination address (domain name or IP address) in the text box and click the *Ping* button.

Example: Ping to grosso.com.

```
Pinging 192.150.14.120 from local address 143.137.199.8 (timer gran. 100 ms)...
    Ping size: 100 Ping Count: 5
    ICMP echo reply from 192.150.14.120, 200 ms
    ICMP echo reply from 192.150.14.120, 100 ms
    No ping response.
    ICMP echo reply from 192.150.14.120, 100 ms
    ICMP echo reply from 192.150.14.120, 100 ms

    --- 192.150.14.120 ping statistics ---
    5 packets transmitted, 4 packets received, 20% packet loss
```

Result: The host was reachable with four out of five packets sent.

Step 4 To use the TraceRoute capability, type a destination address (domain name or IP address) in the text box and click the *TraceRoute* button.

Example: Show the path to the grosso.com site.

```
Traceroute to 192.150.14.120 from address 143.137.199.8 (timer gran. 100 ms)...
 30 hops max, 56 byte packets
 1  143.137.199.254  100 ms  100 ms  0 ms
 2  143.137.50.254  100 ms  0 ms  0 ms
 3  143.137.137.254  100 ms  0 ms  100 ms
 4  141.154.96.161  0 ms  0 ms  100 ms
 5  141.154.8.13  0 ms  100 ms  0 ms
 6  4.24.92.97  0 ms  100 ms  0 ms
 7  4.24.4.225  100 ms  0 ms  100 ms
 8  4.24.7.121  0 ms  0 ms  100 ms
 9  4.24.7.113  0 ms  100 ms  0 ms
10  4.24.6.50  100 ms  0 ms  100 ms
11  4.24.10.86  0 ms  100 ms  100 ms
12  4.24.6.234  0 ms  100 ms  0 ms
13  192.205.32.153  100 ms  0 ms  100 ms
14  12.123.1.122  100 ms  0 ms  100 ms
15  12.122.2.173  100 ms  100 ms  100 ms
16  12.122.2.153  200 ms  100 ms  100 ms
17  12.122.5.149  100 ms  200 ms  100 ms
18  12.123.12.109  100 ms  100 ms  200 ms
19  12.124.32.34  100 ms  100 ms  200 ms
20  192.150.14.120  100 ms ! 100 ms ! 100 ms !
```

Result: It took 20 hops to get to the grosso.com web site.

Step 5 To use the NSLookup capability, type an address (domain name or IP address) in the text box and click the **NSLookup** button

Example: Show the IP Address for grosso.com

```
Server:      controller2.cayman.com
Address:     143.137.137.9

Name:       www.grosso.com
Address:    192.150.14.120
```

Result: The DNS Server doing the lookup is displayed in the **Server:** and **Address:** fields. If the Name Server can find your entry in its table, it is displayed in the **Name:** and **Address:** fields.

System Status

System Status provides a group of links that display status and statistics to help you manage your Gateway. Managing the WAN Users is an example of the management tools available.

Manage a Restricted Number of WAN Users

User Status

On the Home page your WAN User status is prominently displayed in the center area.

WAN			
Status	Up		
IP Address	143.137.50.203		
Default Gateway	143.137.50.254	Netmask	255.255.255.0
DHCP Client	On	DHCP Lease Expires	00:00:46:14
NAT	On	WAN Users	5

To check the user status of the WAN connections when running COS 6.3, use these steps:

Step 1 To obtain additional information, click the *Troubleshoot* toolbar button. From WAN Users, click the *Show* link.

Select an option from the table below:

General	All Status	Overview	Features	Memory
Ports	Ethernet			
IP	Interfaces	Routes	ARP	
WAN Users	Show	Disconnect		
System Log	Entire	Page by Page	Reset	
Other	DHCP Client	DHCP Server		

Number of allowed concurrent WAN users: 5
 Number of WAN connections currently in use: 1

IP WAN Users:

Host Name	IP Address	Timeout
EGrosso2	192.168.1.3	19 minutes

The **Show** link provides this information:

- Number of allowed concurrent WAN users
- Number of WAN connections currently in use
- Address and computer name - of current LAN users
- Timeout - displays status of Idle Timeout Counter. The current user has this amount of time (from an initial 20 minute interval) remaining prior to an automatic disconnect from WAN access.

Disconnect Current WAN Users

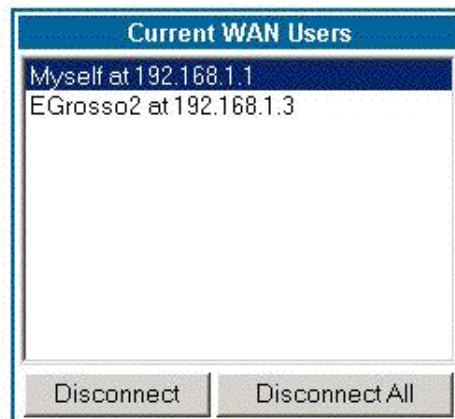
The procedure is as follows:

Step 1 Click the **Disconnect** link from the WAN Users section of the System Status page.

The Disconnect WAN/Internet Users page appears

You may select which internet ("WAN") connection will be disconnected from the list below. Disconnecting a WAN connection will remove that user's access to the WAN, in order to make the connection available to another user. Only users which you are allowed to disconnect will be displayed below.

Please note that your Gateway supports an *unlimited* number of Local Area Network ("LAN") users.



The Admin and User level password accounts have different privileges regarding the Disconnect WAN Users function. They are listed below:

- Admin level privileges allow the Admin to disconnect any and all LAN users from WAN access.
- User level privileges only allow the User to disconnect itself from WAN access.

Step 2 Select the user from the scrolling list.

Step 3 Click the **Disconnect** button. If you want to disconnect all users at once, click the **Disconnect All** button.

Step 4 A confirmation message appears.



Exceeding the WAN User Limit

If your system supports a restricted number of WAN users, web browser users who attempt to access the WAN in excess of the restricted number will receive an “intercept” message on a web page.



No message will be displayed to a user seeking access to other applications requiring WAN connectivity (such as email, instant messaging, remote access, FTP, or telnet).



1. Even with limited concurrent WAN access, all users have **unlimited** access to all LAN resources.
2. Support for multiple concurrent WAN users is available by installing an Unlimited WAN software feature key.



Tour: Command Line Interface

Appendix A

Overview

The Cayman Gateway operating software includes a command line interface (CLI) that lets you access your Cayman Gateway over a telnet or console connection. You can use the command line interface to enter and update the unit's configuration settings, monitor its performance, and restart it.

The CLI has two major command modes: **SHELL** and **CONFIG**. **Summary tables** that list the commands are provided below. Details of the entire command set follow in this section.

SHELL Commands

Command	Status and/or Description
arp	send ARP request
atmping	send ATM OAM loopback (DSL only)
clear	erase all stored configuration information
configure	set the unit's options
diagnose	run the automatic self-test
download	download the config file
help	get more information on a command: "help all" or "help help"
install	download and program an image into flash
log	add a message to the diagnostic log
loglevel	report or change diagnostic log level
netstat	show IP information
nslookup	send DNS query for host
ping	send ICMP echo request
quit	quit this shell
reset	reset subsystems
restart	restart the Gateway
show	display specific system information
start	start subsystem
status	display basic status of Gateway
telnet	telnet to a remote host
traceroute	send traceroute probes
upload	upload config file
who	show who is using the shell
wireless	execute wireless TEACH or LEARN

CONFIG Commands

Command Verbs

set	Set configuration data
define	Define environment data
delete	Delete configuration list data
view	View configuration data
script	Print configuration data
help	Help command option
save	Save configuration data

Keywords

system	Gateway's system options
pppoe	PPP over Ethernet options
trafficshape	Traffic shaping options
dmt	DMT ADSL options (DSL only)
atm	ATM options (DSL only)
bncp	Bridge CP options (DSL only)
ip	TCP/IP protocol options
ip-maps	IPMaps options
dhcp	Dynamic Host Configuration Protocol options
nat-default	Network Address Translation default options
dns	Domain Name System options
bridge	Bridge options
snmp	Simple Network Management Protocol options
ppp	Peer-to-Peer Protocol options
pinhole	Pinhole options
security	Security options
servers	Internal Server options
ethernet-MAC-override	Override the ethernet MAC address (2E only)
validate	Validate configuration settings
preference	Shell environment settings

Command Utilities

top	Go to top level of configuration mode
quit	Exit from configuration mode; return to shell mode
exit	Exit from configuration mode; return to shell mode

Starting and Ending a CLI Session

There are two ways to open a CLI session:

1. Open a telnet connection from a workstation on your network
2. Connect a terminal to the Maintenance Port located on the rear panel of the Cayman Gateway.

Connecting from telnet

You initiate a telnet connection by issuing the following command from an IP host that supports telnet, for example, a personal computer running a telnet application such as NCSA Telnet.

BOTH

telnet <ip_address>

You must know the IP address of the Cayman Gateway before you can make a telnet connection to it. By default, your Cayman Gateway uses 192.168.1.254 as the IP address for its LAN interface. You can use a Web browser or the maintenance console to configure the Cayman Gateway IP address.

Connecting from the Maintenance Console Port

You can connect a terminal or terminal emulator to the maintenance console port on the Cayman Gateway to configure, administer, and monitor your Cayman Gateway.

The settings for your terminal emulator are:

- Speed: 9600 bps
- Parity: None
- Databits: 8
- Stopbits: 1
- Duplex: Full
- Flow Control: None

The console interface uses the same command line interface as the telnet interface.

Logging In

The command line interface log-in process emulates the log-in process for a UNIX host. To logon, enter the username (either admin or user), and your password.

- Entering the administrator password lets you display and update all Cayman Gateway settings.
- Entering a user password lets you display (but not update) Cayman Gateway settings.

When you have logged in successfully, the command line interface lists the user-name and the security level associated with the password you entered in the diagnostic log.

Ending a CLI Session

You end a command line interface session by typing **quit** from the SHELL node of the command line interface hierarchy.

Saving Settings

The **save** command saves the working copy of the settings to the Gateway. The Gateway automatically validates its settings when you save and displays a warning message if the configuration is not correct.

Using the CLI Help Facility

The **help** command lets you display on-line help for SHELL and CONFIG commands. To display a list of the commands available to you from your current location within the command line interface hierarchy, enter **help**.

To obtain help for a specific CLI command, type **help <command>**. You can truncate the **help** command to **h** or a question mark when you request help for a CLI command.

About SHELL Commands

You begin in SHELL mode when you start a CLI session. SHELL mode lets you perform the following tasks with your Cayman Gateway:

- Monitor its performance
- Display and reset Gateway statistics
- Issue administrative commands to restart Cayman Gateway functions

SHELL Prompt

When you are in SHELL mode, the CLI prompt is the name of the Cayman Gateway followed by a right angle bracket (>). For example, if you open a CLI connection to the Cayman Gateway named "Coconut," you would see **Coconut>** as your CLI prompt.

SHELL Command Shortcuts

You can **truncate** most commands in the CLI to their shortest unique string. For example, you can use the truncated command **q** in place of the full **quit** command to exit the CLI. However, you would need to enter **rese** for the **reset** command, since the first characters of **reset** are common to the **restart** command.

The only command you cannot truncate is **restart**. To prevent accidental interruption of communications, you must enter the **restart** command in its entirety.

You can use the Up and Down arrow keys to scroll backward and forward through recent commands you have entered. Alternatively, you can use the **!!** command to repeat the last command you entered.

Platform Convention

For each Shell and Config command, an “Index Tab” shows which platform(s) the command supports. For example

BOTH	arp <i>nnn.nnn.nnn.nnn</i>
Both the Cayman 3220-H and 2E-H platforms use this command.	
DSL	atmping <i>vpi vci</i> [<i>segment</i> <i>end-to-end</i>]
The Cayman 3220-H platform uses this command.	
ENET	reset ppp [enet-B]
The Cayman 2E-H platform uses this command.	

SHELL Commands

BOTH	arp <i>nnn.nnn.nnn.nnn</i>
Sends an Address Resolution Protocol (ARP) request to match the <i>nnn.nnn.nnn.nnn</i> IP address to an Ethernet hardware address.	
DSL	atmping <i>vpi vci</i> [<i>segment</i> <i>end-to-end</i>]
Lets you check the ATM connection reachability and network connectivity. This command sends five Operations, Administration, and Maintenance (OAM) loop-back calls to the specified vpi/vci destination. There is a five second total timeout interval.	
Use the segment argument to ping a neighbor switch. Use the end-to-end argument to ping a remote end node	
BOTH	clear [yes]
Clears the configuration settings in a Cayman Gateway. If you do not use the optional yes qualifier, you are prompted to confirm the clear command.	

BOTH**configure**

Puts the command line interface into Configure mode, which lets you configure your Cayman Gateway with Config commands. Config commands are described starting on [page 105](#).

BOTH**diagnose**

Runs a diagnostic utility to conduct a series of internal checks and loopback tests to verify network connectivity over each interface on your Cayman Gateway. The console displays the results of each test as the diagnostic utility runs. If one test is dependent on another, the diagnostic utility indents its entry in the console window. For example, the diagnostic utility indents the Check IP connect to Ethernet (LAN) entry, since that test will not run if the Check Ethernet LAN Connect test fails.

Each test generates one of the following result codes:

CODE	Description
PASS	The test was successful.
FAIL	The test was unsuccessful.
SKIPPED	The test was skipped because a test on which it depended failed.
PENDING	The test timed out without producing a result. Try running the test again.

BOTH**download [-fw –key *server_address*] [*filename*] [confirm]**

With no flags set, this command installs a file of configuration parameters into the Cayman Gateway from a TFTP (Trivial File Transfer Protocol) server. The TFTP server must be accessible on your Ethernet network.

With the **–fw** flag set, downloads a new firewall text configuration to the Gateway.

With the **–key** flag set, downloads a new feature key to the Gateway.

You can include one or more of the following arguments with the download command. If you omit arguments, the console prompts you for this information.

- The ***server_address*** argument identifies the IP address of the TFTP server from which you want to copy the Cayman Gateway configuration file.
- The ***filename*** argument identifies the path and name of the configuration file on the TFTP server.
- If you include the optional **confirm** keyword, the download begins as soon as all information is entered.

BOTH **install [*server_address*] [*filename*] [*confirm*]**

Downloads a new version of the Cayman Gateway operating software from a TFTP (Trivial File Transfer Protocol) server, validates the software image, and programs the image into the Cayman Gateway memory. After you install new operating software, you must restart the Cayman Gateway.

The TFTP server must be accessible on your Ethernet network. The ***server_address*** argument identifies the IP address of the TFTP server on which your Cayman Gateway operating software is stored. The ***filename*** argument identifies the path and name of the operating software file on the TFTP server.

If you include the optional **confirm** keyword, you will not be prompted to identify a TFTP server or file name. Your Cayman Gateway begins the software installation using its default boot settings.

BOTH **log *message_string***

Adds the message in the ***message_string*** argument to the Cayman Gateway diagnostic log.

BOTH **loglevel [*level*]**

Displays or modifies the types of log messages you want the Cayman Gateway to record. If you enter the **loglevel** command without the optional ***level*** argument, the command line interface displays the current log level setting.

You can enter the **loglevel** command with the ***level*** argument to specify the types of diagnostic messages you want to record. All messages with a level number equal to or greater than the level you specify are recorded. For example, if you specify loglevel 3, the diagnostic log will retain high-level informational messages (level 3), warnings (level 4), and failure messages (level 5).

Use the following values for the *level* argument:

- **1** or **low** – Low-level informational messages or greater; includes trivial status messages.
- **2** or **medium** – Medium-level informational messages or greater; includes status messages that can help monitor network traffic.
- **3** or **high** – High-level informational messages or greater; includes status messages that may be significant but do not constitute errors.
- **4** or **warning** – Warnings or greater; includes recoverable error conditions and useful operator information.
- **5** or **failure** – Failures; includes messages describing error conditions that may not be recoverable.

BOTH **netstat -i**

Displays the IP interfaces for your Cayman Gateway.

BOTH	netstat -r
	Displays the IP routes stored in your Cayman Gateway.
BOTH	nslookup { <i>hostname</i> <i>ip_address</i> }
	Performs a domain name system lookup for a specified host.
	<ul style="list-style-type: none"> The <i>hostname</i> argument is the name of the host for which you want DNS information; for example, nslookup klaatu. The <i>ip_address</i> argument is the IP address, in dotted decimal notation, of the device for which you want DNS information.
BOTH	ping [-s <i>size</i>] [-c <i>count</i>]{ <i>hostname</i> <i>ip_address</i> }
	Causes the Cayman Gateway to issue a series of ICMP Echo requests for the device with the specified name or IP address.
	<ul style="list-style-type: none"> The <i>hostname</i> argument is the name of the device you want to ping; for example, ping ftp.cayman.com. The <i>ip_address</i> argument is the IP address, in dotted decimal notation, of the device you want to locate. If a host using the specified name or IP address is active, it returns one or more ICMP Echo replies, confirming that it is accessible from your network. The -s <i>size</i> argument lets you specify the size of the ICMP packet. The -c <i>count</i> argument lets you specify the number of ICMP packets generated for the ping request.
	You can use the ping command to determine whether a hostname or IP address is already in use on your network. You cannot use the ping command to ping the Cayman Gateway's own IP address.
BOTH	quit
	Exits the Cayman Gateway command line interface.
BOTH	reset arp
	Clears the Address Resolution Protocol (ARP) cache on your unit.
DSL	reset atm
	Resets the ATM statistics to zero.
BOTH	reset crash
	Clears crash-dump information, which identifies the contents of the Cayman Gateway registers at the point of system malfunction.

ENET	reset dhcp client release { B all }
	Releases the DHCP lease the Gateway is currently using to acquire the IP settings for its WAN (Ethernet B) port.
DSL	reset dhcp client release [vcc-id']
	Releases the DHCP lease the Cayman 3220-H is currently using to acquire the IP settings for the specified DSL port. The vcc-id identifier is a letter in the rang B-I. Enter the reset dhcp client release without the variable to see the letter assigned to each virtual circuit.
ENET	reset dhcp client renew { B all }
	Renews the DHCP lease the Gateway is currently using to acquire the IP settings of its WAN (Ethernet B) port.
DSL	reset dhcp client renew [vcc-id']
	Releases the DHCP lease the Cayman 3220-H is currently using to acquire the IP settings for the specified DSL port. The vcc-id identifier is a letter in the rang B-I. Enter the reset dhcp client release without the variable to see the letter assigned to each virtual circuit.
BOTH	reset dhcp server
	Clears the DHCP lease table in the Cayman Gateway.
DSL	reset dsl
	Resets any open DSL connection.
BOTH	reset enet
	Resets Ethernet statistics to zero
BOTH	reset hosts
	Clears all entries in the host name table. Thereafter, when PCs configured as DHCP clients use the Gateway, new entries will be rebuilt. DHCP serving must be enabled.
BOTH	reset ipmap
	Clears the IPMap table (NAT).
BOTH	reset log
	Rewinds the diagnostic log display to the top of the existing Cayman Gateway diagnostic log. The reset log command does not clear the diagnostic log. The next show log command will display information from the beginning of the log file.
ENET	reset ppp [enet-B]
	Resets the point-to-point connection over the WAN interface. When you issue a reset ppp command, the Cayman 2E-H closes any PPP session (including PPP over Ethernet).

DSL	reset ppp <i>vccn</i>	Resets the point-to-point connection over the specified virtual circuit. This command only applies to virtual circuits that use PPP framing.
BOTH	reset security-log	Clears the security monitoring log to make room to capture new entries.
BOTH	reset wan-users [<i>all</i> <i>ip-address</i>]	This function disconnects the specified WAN User to allow for other users to access the WAN. This function is only available if the number of WAN Users is restricted and NAT is on. Use the all parameter to disconnect all users. If you logon as Admin you can disconnect any or all users. If you logon as User, you can only disconnect yourself.
BOTH	restart [<i>seconds</i>]	Restarts your Cayman Gateway. If you include the optional seconds argument, your Cayman Gateway will restart when the specified number of seconds have elapsed. You must enter the complete restart command to initiate a restart.
DSL	show atm [<i>all</i>]	Displays ATM statistics for 3220-H unit. The optional all argument displays a more detailed set of ATM statistics.
BOTH	show bridge interfaces	Displays bridge interfaces maintained by the Cayman Gateway.
BOTH	show bridge table	Displays the bridging table maintained by the Cayman Gateway.
BOTH	show crash	Displays the most recent crash information, if any, for your Cayman Gateway.
BOTH	show dhcp agent	Displays the DHCP relay-agent leases being administered by your Cayman Gateway.
BOTH	show dhcp client	Displays the DHCP address information being used by your Cayman Gateway for each WAN interface.
BOTH	show dhcp server leases [<i>used</i> <i>free</i>]	Displays the DHCP leases stored in RAM by your Cayman Gateway. You can include the used argument to see the list of DHCP leases that are in use or that have been used since your Cayman Gateway was restarted. You can include the free argument to see the list of DHCP leases that are available for use.

BOTH	show dhcp server store
	Displays the DHCP leases stored in NVRAM by your Cayman Gateway.
DSL	show dsl
	Displays DSL port statistics, such as upstream and downstream connection rates and noise levels.
BOTH	show enet
	Displays the Ethernet statistics for your Cayman Gateway.
BOTH	show features
	Show all keyed features and whether or not they are enabled. If the key is not permanent, it shows the expiration date.
BOTH	show hosts
	Displays the IP address and (computer) host name in the host name table for each LAN-side computer. The host name table is built by the Gateway as its DHCP server serves IP addresses to LAN-side computers trying to access the WAN through the Gateway.
BOTH	show ip arp
	Displays the Ethernet address resolution table stored in your Cayman Gateway.
BOTH	show ip firewall
	Shows statistics for the BreakWater Firewall.
BOTH	show ip igmp
	Displays the contents of the IGMP Group Address table and the IGMP Report table maintained by your Cayman Gateway.
BOTH	show ip interfaces
	Displays the IP interfaces for your Cayman Gateway.
BOTH	show ip ipsec
	Shows statistics for the SafeHarbour IPSec tunnel.
BOTH	show ip routes
	Displays the IP routes stored in your Cayman Gateway.
BOTH	show log
	Displays blocks of information from the Cayman Gateway diagnostic log. To see the entire log, you can repeat the show log command or you can enter show log all .

BOTH	show memory [all]
	Displays memory usage information for your Cayman Gateway. If you include the optional all argument, your Cayman Gateway will display a more detailed set of memory statistics.
ENET	show ppp [{ stats lcp ipcp lastconnect }]
	Displays information about open PPP links. You can display a subset of the PPP statistics by including an optional stats , lcp , ipcp , or lastconnect argument for the show ppp command.
DSL	show ppp [{ stats lcp ipcp lastconnect }] [vccn]
	Displays information about open PPP links. You can display a subset of the PPP statistics by including an optional stats , lcp , ipcp , or lastconnect argument for the show ppp command. The optional vccn argument lets you specify the virtual circuit for which you want statistics.
BOTH	show pppoe
	Displays status information for each PPP socket, such as the socket state, service names, and host ID values.
BOTH	show security-log
	Displays up to 100 security-related events stored in the log.
BOTH	show status
	Displays the current status of a Cayman Gateway, the device's hardware and software revision levels, a summary of errors encountered, and the length of time the Cayman Gateway has been running since it was last restarted. Identical to the status command.
BOTH	show wan-users [all]
	Without the all parameter displays the number of concurrent WAN Users and the total number allowed. With the all parameter specified, displays information about each connected WAN User, including its IP address and idle time before automatic disconnect. This function is only available if the number of WAN Users is restricted and NAT is on.
BOTH	show wireless
	Displays status and statistics information for the wireless interface on the Gateway.
ENET	start ppp
	Opens a PPP link (typically PPP over Ethernet).

DSL	start ppp vccn Opens a PPP link on the specified virtual circuit.
BOTH	status Displays the current status of a Cayman Gateway, the device's hardware and software revision levels, a summary of errors encountered, and the length of time the Cayman Gateway has been running since it was last restarted. Identical to the show status command.
BOTH	telnet { <i>hostname</i> <i>ip_address</i> } [<i>port</i>] Lets you open a telnet connection to the specified host through your Cayman Gateway. <ul style="list-style-type: none"> • The <i>hostname</i> argument is the name of the device to which you want to connect; for example, telnet ftp.cayman.com. • The <i>ip_address</i> argument is the IP address, in dotted decimal notation, of the device to which you want to connect. • The <i>port</i> argument is the number of the port over which you want to open a telnet session.
BOTH	traceroute { <i>hostname</i> <i>ip_address</i> } Traces the route between the Cayman Gateway and the specified host. <ul style="list-style-type: none"> • The <i>hostname</i> argument is the name of the device you want to trace; for example, traceroute ftp.cayman.com. • The <i>ip_address</i> argument is the IP address, in dotted decimal notation, of the device you want to trace.
BOTH	upload [<i>server_address</i>] [<i>filename</i>] [<i>confirm</i>] Copies the current configuration settings of the Cayman Gateway to a TFTP (Trivial File Transfer Protocol) server. The TFTP server must be accessible on your Ethernet network. The <i>server_address</i> argument identifies the IP address of the TFTP server on which you want to store the Cayman Gateway settings. The <i>filename</i> argument identifies the path and name of the configuration file on the TFTP server. If you include the optional confirm keyword, you will not be prompted to identify a TFTP server or file name.
BOTH	who Displays the names of the current shell users.

About CONFIG Commands

You reach the configuration mode of the command line interface by typing **con-figure** (or any truncation of **configure**, such as **c** or **config**) at the CLI SHELL prompt.

CONFIG Mode Prompt

When you are in CONFIG mode, the CLI prompt consists of the name of the Cayman Gateway followed by your current **node** in the hierarchy and two right angle brackets (>>). For example, when you enter CONFIG mode (by typing **config** at the SHELL prompt), the `Coconut (top)>>` prompt reminds you that you are at the top of the CONFIG hierarchy. If you move to the **ip** node in the CONFIG hierarchy (by typing **ip** at the CONFIG prompt), the prompt changes to `Coconut (ip)>>` to identify your current location.

Some CLI commands are not available until certain conditions are met. For example, you must enable IP for an interface before you can enter IP settings for that interface.

Navigating the CONFIG Hierarchy

- **Moving from CONFIG to SHELL** — You can navigate from anywhere in the CONFIG hierarchy back to the SHELL level by entering `quit` at the CONFIG prompt and pressing RETURN.

```
Dogzilla (top)>> quit
Dogzilla >
```

- **Moving from top to a subnode** — You can navigate from the top node to a subnode by entering the node name (or the significant letters of the node name) at the CONFIG prompt and pressing RETURN. For example, you move to the IP subnode by entering **ip** and pressing RETURN.

```
Dogzilla (top)>> ip
Dogzilla (ip)>>
```

As a shortcut, you can enter the significant letters of the node name in place of the full node name at the CONFIG prompt. The significant characters of a node name are the letters that uniquely identify the node. For example, since no other CONFIG node starts with I, you could enter one letter ("**i**") to move to the IP node.

- **Jumping down several nodes at once** — You can jump down several levels in the CONFIG hierarchy by entering the complete path to a node.
- **Moving up one node** — You can move up through the CONFIG hierarchy one node at a time by entering the **up** command.
- **Jumping to the top node** — You can jump to the top level from anywhere in the CONFIG hierarchy by entering the **top** command.

- **Moving from one subnode to another** — You can move from one subnode to another by entering a partial path that identifies how far back to climb.
- **Moving from any subnode to any other subnode** — You can move from any subnode to any other subnode by entering a partial path that starts with a top-level CONFIG command.
- **Scrolling backward and forward through recent commands** — You can use the Up and Down arrow keys to scroll backward and forward through recent commands you have entered. When the command you want appears, press Enter to execute it.

Entering Commands in CONFIG Mode

CONFIG commands consist of keywords and arguments. Keywords in a CONFIG command specify the action you want to take or the entity on which you want to act. Arguments in a CONFIG command specify the values appropriate to your site. For example, the CONFIG command

BOTH	set ip ethernet address <i>ip_address</i>
------	--

consists of three keywords (**ip**, **ethernet**, and **address**) and one argument (***ip_address***). When you use the command to configure your Gateway, you would replace the argument with a value appropriate to your site.

For example:

BOTH	set ip ethernet address 192.31.222.57
------	--

Guidelines: CONFIG Commands

The following table provides guidelines for entering and formatting CONFIG commands.

Command component	Rules for entering CONFIG commands
Command verbs	CONFIG commands must start with a command verb (set, view, delete). You can truncate CONFIG verbs to three characters (set, vie, del). CONFIG verbs are case-insensitive. You can enter "SET," "Set," or "set."
Keywords	Keywords are case-insensitive. You can enter "Ethernet," "ETHERNET," or "ethernet" as a keyword without changing its meaning. Keywords can be abbreviated to the length that they are differentiated from other keywords.
Argument Text	Text strings can be as many as 64 characters long, unless otherwise specified. Special characters are represented using backslash notation. Text strings may be enclosed in double (") or single (') quote marks. If the text string includes an embedded space, it must be enclosed in quotes. Special characters are represented using backslash notation.

Command component	Rules for entering CONFIG commands
Numbers	Enter numbers as integers.
IP addresses	Enter IP addresses in dotted decimal notation (0 to 255).

If a command is ambiguous or miskeyed, the CLI prompts you to enter additional information. For example, you must specify which virtual circuit you are configuring when you are setting up a Cayman Gateway.

Displaying Current Gateway Settings

You can use the **view** command to display the current CONFIG settings for your Cayman Gateway. If you enter the **view** command at the top level of the CONFIG hierarchy, the CLI displays the settings for all enabled functions. If you enter the **view** command at an intermediate node, you see settings for that node and its subnodes.

Step Mode: A CLI Configuration Technique

The Cayman Gateway command line interface includes a step mode to automate the process of entering configuration settings. When you use the CONFIG step mode, the command line interface prompts you for all required and optional information. You can then enter the configuration values appropriate for your site without having to enter complete CLI commands.

When you are in step mode, the command line interface prompts you to enter required and optional settings. If a setting has a default value or a current setting, the command line interface displays the default value for the command in parentheses. If a command has a limited number of acceptable values, those values are presented in brackets, with each value separated by a vertical line. For example, the following CLI step command indicates that the default value is **off** and that valid entries are limited to **on** and **off**.

```
option (off) [on | off]: on
```

You can accept the default value for a field by pressing the Return key. To use a different value, enter it and press Return.

You can enter the CONFIG step mode by entering **set** from the top node of the CONFIG hierarchy. You can enter step mode for a particular service by entering **set service_name**. For example:

```
Dogzilla (top)>> set system
Stepping set mode (press Control-X <Return/Enter> to
exit)
...
system
  name ("Dogzilla"): Mycroft
  Diagnostic Level (High): medium
Stepping mode ended.
```

Validating Your Configuration

You can use the **validate** CONFIG command to make sure that your configuration settings have been entered correctly. If you use the **validate** command, the Cayman Gateway verifies that all required settings for all services are present and that settings are consistent.

```
Dogzilla (top)>> validate
Error: Subnet mask is incorrect
Global Validation did not pass inspection!
```

You can use the **validate** command to verify your configuration settings at any time. Your Cayman Gateway automatically validates your configuration any time you save a modified configuration.

CONFIG Commands

This section describes the keywords and arguments for the various CONFIG commands.

ATM Settings

You can use the CLI to set up each ATM virtual circuit.

DSL
set atm option {on | off }

Enables the WAN interface of 3220-H to be configured using the Asynchronous Transfer Mode (ATM) protocol.

DSL
set atm [vccn] option {on | off }

Selects the virtual circuit for which further parameters are set. Up to eight VCCs are supported; the maximum number is dependent on your Cayman Operating System tier and the capabilities that your Service Provider offers.

DSL
set atm [vccn] vpi { 0 ... 255 }

Select the virtual path identifier (vpi) for VCC n.

Your Service Provider will indicate the required vpi number.

DSL
set atm [vccn] vci { 0 ... 65535 }

Select the virtual channel identifier (vci) for VCC n.

Your Service Provider will indicate the required vci number.

DSL
**set atm [vccn] encap
{ ppp-vc | ppp-llc | ether-vcmux | ether-llc |
ip-vcmux | ip-llc | ppoe-vcmux | ppoe-llc }**

Select the encapsulation mode for VCC n. The options are:

ppp-vc	PPP over ATM, VC-muxed
ppp-llc	PPP over ATM, LLC-SNAP
ether-vcmux	RFC-1483, bridged Ethernet, VC-muxed
ether-llc	RFC-1483, bridged Ethernet, LLC-SNAP
ip-vcmux	RFC-1483, routed IP, VC-muxed
ip-llc	RFC-1483, routed IP, LLC-SNAP
pppoe-vcmux	PPP over Ethernet, VC-muxed
pppoe-llc	PPP over Ethernet, LLC-SNAP

Your Service Provider will indicate the required encapsulation mode.

DSL	set atm [vccn] pppoe-sessions { 1 ... 8 }
	Select the number of PPPoE sessions to be configured for VCC n. Up to eight can be configured on the first VCC; one on the other VCCs. The total must be less than or equal to eight.
DSL	set atm [vccn] tx-priority [low high]
	Select the transmission priority for vcc n. The Gateway transmits traffic for high priority VCCs before it transmits traffic for low priority VCCs. Bandwidth is split between VCCs of equal priority.
DSL	set atm [vccn] tx-max-kbps [0 <no limit> 1 -1000]
	Specifies the maximum upstream (transmission) rate of the virtual circuit (measured in kilobytes per second). Zero (0) indicates no restriction on transmission rate.

Bridging Settings

Bridging lets the Cayman Gateway use MAC (Ethernet hardware) addresses to forward non-TCP/IP traffic from one network to another. When bridging is enabled, the Cayman Gateway maintains a table of up to 255 MAC addresses. Entries that are not used within 10 minutes are dropped. If the bridging table fills up, the oldest table entries are dropped to make room for new entries.

Virtual circuits that use IP framing cannot be bridged.

BOTH	set bridge option {on off }
	Enables or disables bridging services in the Cayman Gateway. You must enable bridging services within the Cayman Gateway before you can enable bridging for a specific interface.
ENET	set bridge ethernet [A B] option { on off }
	Enables or disables bridging services for the Ethernet interface.
DSL	set bridge ethernet option { on off }
	Enables or disables bridging services for the specified virtual circuit using Ethernet framing.
ENET	set bridge ethernet [A B] filters pppoe-only { on off }
	Enables or disables bridging services for the specified Ethernet interface.
DSL	set bridge ethernet A filters pppoe-only { on off }
	Enables or disables bridging services for the specified Ethernet interface.
DSL	set bridge interwan-bridging { on off }
	Enables or disables bridging between virtual circuit connections.

DHCP Settings

As a Dynamic Host Control Protocol (DHCP) server, your Cayman Gateway can assign IP addresses and provide configuration information to other devices on your network dynamically. A device that acquires its IP address and other TCP/IP configuration settings from the Cayman Gateway can use the information for a fixed period of time (called the DHCP lease).

BOTH

set dhcp option { off | server | relay-agent }

Enables or disables DHCP services in the Cayman Gateway. You must enable DHCP services before you can enter other DHCP settings for the Cayman Gateway.

If you turn off DHCP services and save the new configuration, the Cayman Gateway clears its DHCP settings.

BOTH

set dhcp start-address *ip_address*

If you selected **server**, specifies the first address in the DHCP address range. The Cayman Gateway can reserve a sequence of up to 253 IP addresses within a subnet, beginning with the specified address for dynamic assignment.

BOTH

set dhcp end-address *ip_address*

If you selected **server**, specifies the last address in the DHCP address range.

BOTH

set dhcp lease-time *lease-time*

If you selected **server**, specifies the default length for DHCP leases issued by the Cayman Gateway. Enter lease time in **dd:hh:mm:ss** (day/hour/minute/second) format.

BOTH

set dhcp relay-agent *ip_address*

If you selected **relay-agent**, specifies the IP address in the remote DHCP server to which your Cayman Gateway relays DHCP requests.

DMT Settings

DSL **set dmt type [lite | dmt | ansi | multi]**

Selects the type of Discrete Multitone (DMT) asynchronous digital subscriber line (ADSL) protocol to use for the WAN interface.

Domain Name System Settings

Domain Name System (DNS) is an information service for TCP/IP networks that uses a hierarchical naming system to identify network domains and the hosts associated with them. You can identify a primary DNS server and one secondary server.

BOTH **set dns domain-name *domain-name***

Specifies the default domain name for your network. When an application needs to resolve a host name, it appends the default domain name to the host name and asks the DNS server if it has an address for the “fully qualified host name.”

BOTH **set dns primary-address *ip_address***

Specifies the IP address of the primary DNS name server.

BOTH **set dns secondary-address *ip_address***

Specifies the IP address of the secondary DNS name server. Enter 0.0.0.0 if your network does not have a secondary DNS name server.

Ethernet MAC Address Settings

You can use the CLI to change the Ethernet MAC address associated with the WAN port on your Cayman 2E-H.

ENET **set ethernet-MAC-override option { on | off }**

Enables or disables your ability to override the Ethernet MAC address associated with the WAN port on your unit. You must enable the Ethernet MAC address override before you can specify a new Ethernet MAC address.

ENET **set ethernet-MAC-override address *mac_address***

Specifies the Ethernet MAC address (in hexadecimal nn.nn.nn.nn.nn.nn format) for your Cayman 2E-H.



To restore the default MAC address for the Cayman 2E-H WAN port, enter the set **ethernet-MAC-override option off** command and restart your unit.

IP Settings

You can use the command line interface to specify whether TCP/IP is enabled, identify a default Gateway, and to enter TCP/IP settings for the Cayman Gateway LAN and WAN ports. If PPPoE is turned off, you must specify settings for Ethernet A and B separately. If PPPoE is turned on, you can omit the A/B labels.

Basic Settings

BOTH	set ip option { on off }
	Enables or disables TCP/IP services in the Cayman Gateway. You must enable TCP/IP services before you can enter other TCP/IP settings for the Cayman Gateway. If you turn off TCP/IP services and save the new configuration, the Cayman Gateway clears its TCP/IP settings.
BOTH	set ip ipsec-passthrough (on) {on off}
	IPSec PassThrough supports VPN clients running on LAN-connected computers. Turn this setting off if your LAN-side VPN client includes its own NAT interoperability solution.

DSL Settings

DSL	set ip dsl vccn option { on off }
	Specifies whether virtual circuit n on 3220-H is active (where n is a number in the range 1-8). You must enable a virtual circuit before you can enter other settings for it.
DSL	set ip dsl vccn address <i>ip_address</i>
	Assigns an IP address to the virtual circuit. Enter 0.0.0.0 if you want the virtual circuit to obtain its IP address from a remote DHCP server.
DSL	set ip dsl vccn broadcast <i>broadcast_address</i>
	Specifies the broadcast address for the TCP/IP network connected to the virtual circuit. IP hosts use the broadcast address to send messages to every host on your network simultaneously. The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.
DSL	set ip dsl vccn netmask <i>netmask</i>
	Specifies the subnet mask for the TCP/IP network connected to the virtual circuit. The subnet mask specifies which bits of the 32-bit binary IP address represents network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

DSL

```
set ip dsl vccn restriction { admin-disabled | admin-only | none }
```

Specifies restrictions on the types of traffic the 3220-H accepts over the DSL virtual circuit. The **admin-disabled** argument means that router traffic is accepted but that administrative commands are ignored. The **admin-only** argument means that router traffic is ignored by that administrative commands are accepted. The **none** argument means that all traffic is accepted. RIP and ICMP traffic is still accepted.

DSL

```
set ip dsl vccn addr-mapping { on | off }
```

Specifies whether you want the 3220-H to use network address translation (NAT) when communicating with remote routers. Address mapping lets you conceal details of your network from remote routers. It also permits all LAN devices to share a single IP address.

By default, address mapping is turned "On".

DSL

```
set ip dsl vccn proxy-arp { on | off }
```

Specifies whether you want the 3220-H to respond when it receives an address resolution protocol for devices behind it.

By default, proxy ARP is turned "Off".

Ethernet Settings

ENET

```
set ip ethernet [ A | B ] option { on | off }
```

Enables or disables communications through the designated Ethernet port in the Gateway. You must enable TCP/IP functions for and Ethernet port before you can configure it network settings



Many of these setting commands are designated as **BOTH**.
Note however:

For the 2E-H (ENET platform) you have the option of selecting the **A** or **B** ethernet port within the line command.

For the 3220-H (DSL platform) you are specifying the **A** port (your local LAN) only.

BOTH

```
set ip ethernet [ A | B ] address ip_address
```

Assigns an IP address to the Cayman Gateway on the local area network. The IP address you assign to the local Ethernet interface must be unique on your network. By default, the Cayman Gateway uses 192.168.1.254 as its LAN IP address.

BOTH	set ip ethernet [A B] broadcast <i>broadcast_address</i>
	<p>Specifies the broadcast address for the local Ethernet interface. IP hosts use the broadcast address to send messages to every host on your network simultaneously.</p> <p>The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255.</p>
BOTH	set ip ethernet [A B] netmask <i>netmask</i>
	<p>Specifies the subnet mask for the local Ethernet interface. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).</p>
DSL	set ip ethernet A restrictions { none admin-disabled }
	<p>Specifies whether an administrator can open a telnet connection to the Cayman Gateway over the Ethernet interface to monitor and configure the unit.</p>
ENET	set ip ethernet [A B] restrictions { none admin-disabled } set ip ethernet [A B] restrictions { none admin-disabled admin-only }
	<p>Specifies whether an administrator can open a telnet connection to the Cayman Gateway over the Ethernet interface to monitor and configure the unit. On the 2E-H's LAN port you can enable or disable administrator access. On the WAN port, you can enable or disable administrator access or specify that the WAN port can only be used for administrative traffic. By default, administrative restrictions are turned off on both Ethernet ports, meaning an administrator can open a telnet connection through either port.</p>



If you specify **admin-only** access for the Cayman 2E-H WAN port, you will turn off routing services through that port. RIP and ICMP traffic is still accepted.

Do **NOT** turn on **admin-only** access without consulting with your network administrator.

BOTH	set ip ethernet [A B] proxy-arp { on off }
	Specifies whether you want the Cayman Gateway to respond when it receives an address resolution protocol for devices behind it. By default, proxy ARP is turned off.
BOTH	set ip ethernet [A B] rip-send { off v1 v2 v1-compatible v2-MD5 }
	Specifies whether the Cayman Gateway should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to other routers on your network. RIP Version 2 (RIP-2) is an extension of the original Routing Information Protocol (RIP-1) that expands the amount of useful information in the RIP packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several new features, including inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting (which reduces the load on hosts which do not support routing protocols. RIP-2 with MD5 authentication is an extension of RIP-2 that increases security by requiring an authentication key when routes are advertised.
	Depending on your network needs, you can configure your Cayman Gateway to support RIP-1, RIP-2, or both.
BOTH	set ip ethernet [A B] rip-receive { off v1 v2 v1-compatible v2-MD5 }
	Specifies whether the Cayman Gateway should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on your network.
ENET	set ip ethernet B addr-mapping { off on }
	Specifies whether Network Address Translation (NAT) is enabled for the WAN (Ethernet B) port on the Cayman Gateway.

Default IP Gateway Settings

BOTH	set ip gateway option { on off }
	Specifies whether the Cayman Gateway should send packets to a default Gateway if it does not know how to reach the destination host.
ENET	set ip gateway interface { ip-address ppp }
	Specifies how the Cayman 2E-H should route information to the default Gateway. If you select ip-address , you must enter the IP address of a host on a local or remote network. If you specify ppp , the Cayman unit uses the default gateway being used by the remote PPP peer.

DSL**set ip gateway interface { ip-address | ppp-vccn }**

Specifies whether the Gateway is reached using a fixed IP address or through a PPP virtual circuit.

BOTH**set ip gateway default *ip_address***

Specifies the IP address of the default IP Gateway.

WAN-to-WAN Routing Settings

Use the following command to configure settings for routing between WAN connections.

BOTH**set ip interwan-routing { on | off }**

Enables or disables routing between WAN connections.

IP-over-PPP Settings

Use the following commands to configure settings for routing IP over a virtual PPP interface.



Many of these setting commands are designated as **BOTH**.

Note however:

For the 3220-H (DSL platform) you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

This argument does not apply to the 2E-H platform.

BOTH**set ip ip-ppp [*vccn*] option { on | off }**

Enables or disables IP routing through the virtual PPP interface. By default, IP routing is turned off. You must enable IP routing before you can enter other IP routing settings for the virtual PPP interface. If you turn off IP routing and save the new configuration, the Cayman Gateway clears IP routing settings

BOTH**set ip ip-ppp [*vccn*] address *ip_address***

Assigns an IP address to the virtual PPP interface. If you specify an IP address other than 0.0.0.0, your Cayman Gateway will not negotiate its IP address with the remote peer. If the remote peer does not accept the IP address specified in the *ip_address* argument as valid, the link will not come up.

The default value for the **ip_address** argument is 0.0.0.0, which indicates that the virtual PPP interface will use the IP address assigned to it by the remote peer. Note that the remote peer must be configured to supply an IP address to your Cayman Gateway if you enter 0.0.0.0 for the **ip_address** argument.

BOTH

set ip ip-ppp [vccn] peer-address ip_address

Specifies the IP address of the peer on the other end of the PPP link. If you specify an IP address other than 0.0.0.0, your Cayman Gateway will not negotiate the remote peer's IP address. If the remote peer does not accept the address in the **ip_address** argument as its IP address (typically because it has been configured with another IP address), the link will not come up.

The default value for the **ip_address** argument is 0.0.0.0, which indicates that the virtual PPP interface will accept the IP address returned by the remote peer. If you enter 0.0.0.0, the peer system must be configured to supply this address.

BOTH

**set ip ip-ppp [vccn] restriction
{ admin-disabled | admin-only | none }**

Specifies restrictions on the types of traffic the Cayman Gateway accepts over the PPP virtual circuit. The **admin-only** argument means that router traffic is ignored but that administrative commands are accepted. The **none** argument means that all traffic is accepted.

BOTH

set ip ip-ppp [vccn] addr-mapping { on | off }

Specifies whether you want the Cayman Gateway to use network address translation (NAT) when communicating with remote routers. Network address translation lets you conceal details of your network from remote routers. By default, address mapping is turned on.

BOTH

set ip ip-ppp [vccn] vj-compression { on | off }

Specifies whether you want to negotiate Van Jacobson header compression for asynchronous PPP links. By default, TCP/IP header compression is turned on.

When Van Jacobson header compression is turned on, your Cayman Gateway allocates memory for 16 slots (headers) by default. The number of slots may be reduced during link configuration if the remote peer can only support a lower number.

BOTH

set ip ip-ppp [vccn] ipcp-subnet { on | off }

Specifies whether you want your Cayman Gateway to negotiate allocation of an IP subnet, rather than a single IP address, from a remote access server. You should only enable this feature if you are told to do so by your Internet Service Provider.

DSL

set ip ip-ppp [vccn] rip-send {off | v1 | v2 | v1-compatible}

Specifies whether the 3220-H unit should use Routing Information Protocol (RIP) broadcasts to advertise its routing tables to routers on the other side of the PPP link. An extension of the original Routing Information Protocol (RIP-1), RIP Version 2 (RIP-2) expands the amount of useful information in the packets. While RIP-1 and RIP-2 share the same basic algorithms, RIP-2 supports several new features.

For example, inclusion of subnet masks in RIP packets and implementation of multicasting instead of broadcasting. This last feature reduces the load on hosts which do not support routing protocols.

This command is only available when address mapping for the specified virtual circuit is turned "off".

DSL

set ip ip-ppp [*vccn*] rip-receive {off | v1 | v2 | v1-compatible}

Specifies whether the 3220-H should use Routing Information Protocol (RIP) broadcasts to update its routing tables with information received from other routers on the other side of the PPP link.

This command is only available when address mapping for the specified virtual circuit is turned "off".

DSL

set ip ip-ppp [*vccn*] flush-routes { on | off }

Specifies whether the 3220-H should flush (delete) entries from its routing table when the specified virtual circuit is down and those routes are inaccessible.

This command is only available when address mapping for the specified virtual circuit is turned "off".

Static ARP Settings

Your Cayman Gateway maintains a dynamic Address Resolution Protocol (ARP) table to map IP addresses to Ethernet (MAC) addresses. Your Cayman Gateway populates this ARP table dynamically, by retrieving IP address/MAC address pairs only when it needs them. Optionally, you can define static ARP entries to map IP addresses to their corresponding Ethernet MAC addresses. Unlike dynamic ARP table entries, static ARP table entries do not time out.

You can configure as many as 16 static ARP table entries for a Cayman Gateway. Use the following commands to add static ARP entries to the Cayman Gateway static ARP table:

BOTH

set ip static-arp ip-address *ip_address*

Specifies the IP address for the static ARP entry. Enter an IP address in the *ip_address* argument in dotted decimal format. The *ip_address* argument cannot be 0.0.0.0.

BOTH

set ip static-arp hardware-address *MAC_address*

Specifies the Ethernet hardware address for the static ARP entry. Enter an Ethernet hardware address in the *MAC_address* argument in *nn.nn.nn.nn.nn.nn* (hexadecimal) format.

Static Route Settings

A static route identifies a manually configured pathway to a remote network. Unlike dynamic routes, which are acquired and confirmed periodically from other routers, static routes do not time out. Consequently, static routes are useful when working with PPP, since an intermittent PPP link may make maintenance of dynamic routes problematic.

You can configure as many as 16 static IP routes for a Cayman Gateway. Use the following commands to maintain static routes to the Cayman Gateway routing table:

BOTH	set ip static-routes destination-network <i>net_address</i>
	Specifies the network address for the static route. Enter a network address in the <i>net_address</i> argument in dotted decimal format. The <i>net_address</i> argument cannot be 0.0.0.0.
BOTH	set ip static-routes destination-network <i>net_address netmask netmask</i>
	Specifies the subnet mask for the IP network at the other end of the static route. Enter the <i>netmask</i> argument in dotted decimal format. The subnet mask associated with the destination network must represent the same network class (A, B, or C) or a lower class (such as a class C subnet mask for class B network number) to be valid.
BOTH	set ip static-routes destination-network <i>net_address interface { ip-address ppp }</i>
	Specifies the interface through which the static route is accessible. If using a 3220-H platform the interface argument options are <i>{ ip-address ppp-vccn }</i> .
BOTH	set ip static-routes destination-network <i>net_address gateway-address gate_address</i>
	Specifies the IP address of the Gateway for the static route. The default Gateway must be located on a network connected to the Cayman Gateway configured interface.
BOTH	set ip static-routes destination-network <i>net_address metric integer</i>
	Specifies the metric (hop count) for the static route. The default metric is 1. Enter a number from 1 to 15 for the integer argument to indicate the number of routers (actual or best guess) a packet must traverse to reach the remote network. You can enter a metric of 1 to indicate either: <ul style="list-style-type: none"> • The remote network is one router away and the static route is the best way to reach it;

- The remote network is more than one router away but the static route should not be replaced by a dynamic route, even if the dynamic route is more efficient.

BOTH

delete ip static-routes destination-network
net_address

Deletes a static route. Deleting a static route removes all information associated with that route.

WAN Settings



Many of these setting commands are designated as **BOTH**.
Note however:

For the 3220-H (DSL platform) you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

This argument does not apply to the 2E-H platform.

Also note that the 3220-H refers to the “specified VCC interface” while the 2E refers to the “WAN Ethernet port.”

BOTH

set ip wan [vccn] option { on | off }

Enables or disables communications through the WAN Ethernet port [or specified VCC Interface] in the Cayman Gateway. You must enable TCP/IP [or BNCP] functions for the WAN port before you can configure its network settings.

BOTH

set ip wan [vccn] address *ip_address*

Assigns an IP address to the Cayman Gateway on the WAN [or specified VCC interface]. The IP address you assign must be unique on your network.

BOTH

set ip wan [vccn] broadcast *broadcast_address*

Specifies the broadcast address for the TCP/IP network connected to the WAN Ethernet port [or specified VCC interface]. IP hosts use the broadcast address to send messages to every host on your network simultaneously.

The broadcast address for most networks is the network number followed by 255. For example, the broadcast address for the 192.168.1.0 network would be 192.168.1.255. .

BOTH

set ip wan [vccn] netmask *netmask*

Specifies the subnet mask for the TCP/IP network connected to the WAN Ethernet port [or specified VCC interface]. The subnet mask specifies which bits of the 32-bit binary IP address represent network information. The default subnet mask for most networks is 255.255.255.0 (Class C subnet mask).

BOTH**set ip wan [vccn] restrictions
{ admin-disabled | admin-only | none }**

Specifies whether an administrator can open a telnet connection to the Cayman Gateway over the WAN Ethernet interface [or specified VCC interface] to monitor and configure the Cayman Gateway. The **admin-only** argument means that router traffic is ignored but that administrative commands are accepted. The **none** argument means that all traffic is accepted.



If you specify **admin-only** access for the Cayman Gateway WAN port, you will turn off routing services through that port or interface. Do **NOT** turn on **admin-only** access without consulting with your network administrator.

BOTH**set ip wan [vccn] addr-mapping { off | on }**

Specifies whether network address translation (NAT) is enabled for the WAN port [or specified VCC interface] on the Cayman Gateway.

BOTH**set ip wan [vccn] proxy-arp { on | off }**

Specifies whether you want the Cayman Gateway to respond when it receives an address resolution protocol for devices behind it. By default, proxy ARP is turned "**off**".

IPMaps Settings

BOTH**set ip-maps name <name> internal-ip <ip address>**

Specifies the name and static ip address of the LAN device to be mapped.

BOTH**set ip-maps name <name> external-ip <ip address>**

Specifies the name and static ip address of the WAN device to be mapped. Up to 253 mapped static IP addresses are supported.

Network Address Translation (NAT) Default Settings

NAT default settings let you specify whether you want your Cayman Gateway to forward NAT traffic to a default server when it doesn't know what else to do with it. The NAT default host function is useful in situations where you cannot create a specific NAT pinhole for a traffic stream because you cannot anticipate what port number an application might use. For example, some network games select arbitrary port numbers when a connection is being opened. By identifying your computer (or another host on your network) as a NAT default server, you can specify that NAT traffic that would otherwise be discarded by the Cayman Gateway should be directed to a specific hosts.

BOTH	set nat-default option { off on }
-------------	--

Specifies whether you want your Cayman Gateway to forward NAT traffic to a default server when it doesn't know what else to do with it.

BOTH	set nat-default address <i>ip-address</i>
-------------	--

Specifies the IP address of the NAT default server.

Network Address Translation (NAT) Pinhole Settings

NAT pinholes let you pass specific types of network traffic through the NAT interfaces on the Cayman Gateway. NAT pinholes allow you to route selected types of network traffic, such as FTP requests or HTTP (Web) connections, to a specific host behind the Cayman Gateway transparently.

To set up NAT pinholes, you identify the type(s) of traffic you want to redirect by port number, and you specify the internal host to which each specified type of traffic should be directed.

The following list identifies protocol type and port number for common TCP/IP protocols:

- FTP (TCP 21)
- telnet (TCP 23)
- SMTP (TCP 25),
- TFTP (UDP 69)
- SNMP (TCP 161, UDP 161)

BOTH	set pinhole name <i>name</i>
-------------	-------------------------------------

Specifies the identifier for the entry in the router's pinhole table. You can name pinhole table entries sequentially (1, 2, 3), by port number (21, 80, 23), by protocol, or by some other naming scheme.

BOTH	set pinhole protocol-select { tcp udp icmp pptp other }	Specifies the type of protocol being redirected.
BOTH	set pinhole numerical-protocol [0 - 65535]	If you select other , specifies the number of the protocol you want to translate.
BOTH	set pinhole external-port-start [0 - 65535]	Specifies the first port number in the range being translated.
BOTH	set pinhole external-port-end [0 - 65535]	Specifies the last port number in the range being translated.
BOTH	set pinhole internal-ip <i>internal-ip</i>	Specifies the IP address of the internal host to which traffic of the specified type should be transferred.
BOTH	set pinhole internal-port <i>internal-port</i>	Specifies the port number your Cayman Gateway should use when forwarding traffic of the specified type. Under most circumstances, you would use the same number for the external and internal port.

PPPoE Settings

You can use the following commands to configure basic settings, port authentication settings, and peer authentication settings for PPP interfaces on your Cayman Gateway.

ENET	set pppoe { on off }	Enables or disables PPP over Ethernet on your 2E-H unit. You must enable PPPoE before you can enter other PPP settings.
-------------	-------------------------------	---

Configuring Basic PPP Settings



Many of these setting commands are designated as **BOTH**.
Note however:

For the 3220-H (DSL platform) you must identify the virtual PPP interface [**vccn**], a number from 1 to 8.

This argument does not apply to the 2E-H platform.

BOTH	set PPP module [vccn] option { on off }
	Enables or disables PPP on the Cayman Gateway.
BOTH	set PPP module [vccn] mru <i>integer</i>
	Specifies the Maximum Receive Unit (MRU) for the PPP interface. The <i>integer</i> argument can be any number between 128 and 2048.
BOTH	set PPP module [vccn] magic-number { on off }
	Enables or disables LCP magic number negotiation.
BOTH	set PPP module [vccn] protocol-compression { on off }
	Specifies whether you want the Cayman Gateway to compress the PPP Protocol field when it transmits datagrams over the PPP link.
BOTH	set PPP module [vccn] lcp-echo-requests { on off }
	Specifies whether you want your Cayman Gateway to send LCP echo requests. You should turn off LCP echoing if you do not want the Cayman Gateway to drop a PPP link to a nonresponsive peer.
BOTH	set PPP module [vccn] failures-max <i>integer</i>
	Specifies the maximum number of Configure-NAK messages the PPP module can send without having sent a Configure-ACK message. The integer argument can be any number between 1 and 20.
BOTH	set PPP module [vccn] configure-max <i>integer</i>
	Specifies the maximum number of unacknowledged configuration requests that your Cayman Gateway will send. The integer argument can be any number between 1 and 10.
BOTH	set PPP module [vccn] terminate-max <i>integer</i>
	Specifies the maximum number of unacknowledged termination requests that your Cayman Gateway will send before terminating the PPP link. The integer argument can be any number between 1 and 10.

BOTH**set PPP module [vccn] restart-timer *integer***

Specifies the number of seconds the Cayman Gateway should wait before retransmitting a configuration or termination request. The integer argument can be any number between 1 and 30.

BOTH**set PPP module [vccn] connection-type
{ instant-on | always-on }**

Specifies whether a PPP connection is maintained by the Cayman Gateway when it is unused for extended periods. If you specify **always-on**, the Cayman Gateway never shuts down the PPP link. If you specify **instant-on**, the Cayman Gateway shuts down the PPP link after the number of seconds specified in the **time-out** setting (below) if no traffic is moving over the circuit.

BOTH**set PPP module [vccn] time-out *integer***

If you specified a connection type of **instant-on**, specifies the number of seconds, in the range 30-600, the Cayman Gateway should wait for communication activity before terminating the PPP link.

Configuring Port Authentication

You can use the following commands to specify how your Cayman Gateway should respond when it receives an authentication request from a remote peer.

The settings for port authentication on the local Cayman Gateway must match the authentication that is expected by the remote peer. For example, if the remote peer requires CHAP authentication and has a name and CHAP secret for the Cayman Gateway, you must enable CHAP and specify the same name and secret on the Cayman Gateway before the link can be established.

BOTH**set PPP module [vccn] port-authentication
chap-option { on | off }**

Specifies whether CHAP authentication is enabled. CHAP authentication must be enabled before you can enter other CHAP information. If CHAP is turned on, it will be the first authentication method offered to the remote peer during link negotiation.

If you turn port authentication off and peer authentication on, the PPP software still uses the port authentication chap-name and pap-name for authentication. As a result, the port authentication names for PAP and CHAP must be identical to the peer names for your Cayman Gateway on the remote peer. If you do not configure a chap-name or pap-name, then the authentication packets sent by the local peer will have blank name values. This may cause authentication to fail for some PPP implementations.

BOTH	set PPP module [vccn] port-authentication chap-name <i>chap_name</i>	Specifies the name the Cayman Gateway sends in a CHAP response packet. The <i>chap_name</i> argument is 1-64 alphanumeric characters. The information you enter must match the CHAP username configured in the remote PPP peer's authentication database.
BOTH	set PPP module [vccn] port-authentication chap-secret <i>secret</i>	Specifies the CHAP secret for CHAP authentication. The secret argument is 1-64 alphanumeric characters. The information you enter must match the CHAP secret used by the PPP peer.
BOTH	set PPP module [vccn] port-authentication pap-option { on off }	Specifies whether PAP authentication is enabled for a port. By default, PAP authentication is turned off. PAP authentication must be enabled before you can enter other PAP information. If you disable PAP authentication and save the modified configuration, your Cayman Gateway retains its PAP settings.
BOTH	set PPP module [vccn] port-authentication pap-name <i>pap_name</i>	Specifies the name the Cayman Gateway sends in a PAP response packet. The <i>pap_name</i> argument is 1- 64 alphanumeric characters. The information you enter must match the PAP username configured in the PPP peer's authentication database.
BOTH	set PPP module port-authentication pap-password <i>password</i>	Specifies the password the Cayman Gateway sends when a PPP peer sends a PAP authentication request. The password argument is 1-64 alphanumeric characters. The information you enter must match the PAP password used by the PPP peer.

Configuring Peer Authentication

You can specify that your Cayman Gateway will use PAP, CHAP, or both to authenticate a remote peer as a PPP link is being completed. Perform the following steps to specify how your Cayman Gateway should authenticate remote peers.

BOTH	set PPP module [vccn] peer-authentication chap-option { on off }
	Specifies whether the Cayman Gateway will use CHAP to authenticate connections to PPP peers.
BOTH	set PPP module [vccn] peer-authentication pap-option { on off }
	Specifies whether the Cayman Gateway will use PAP to authenticate connections to PPP peers.
BOTH	set PPP peer-database <i>peer-name</i> hostname
	Specifies the hostname for an authorized PPP peer. The hostname argument is 1-64 alphanumeric characters. The information you enter must match the user-name that will be returned by the PPP peer when it is being authenticated.
BOTH	set PPP peer-database <i>peer-name</i> hostname chap-secret <i>secret</i>
	Specifies the secret associated with a PPP peer. The secret argument is 1-64 alphanumeric characters. The information you enter must match the secret that will be returned by the PPP peer when it is being authenticated.
BOTH	set PPP peer-database <i>peer-name</i> hostname pap-password <i>password</i>
	Specifies the password associated with a PPP peer. The password argument is 1-64 alphanumeric characters. The password you enter for that peer must match the password that will be returned by the PPP peer when it is being authenticated.

Command Line Interface Preference Settings

You can set command line interface preferences to customize your environment.

BOTH	set preference verbose { on off } set define verbose { on off }
	<p>Specifies whether you want command help and prompting information displayed. By default, the command line interface verbose preference is turned off. If you turn it on, the command line interface displays help for a node when you navigate to that node.</p>
BOTH	set preference more <i>lines</i> set define more <i>lines</i>
	<p>Specifies how many lines of information you want the command line interface to display at one time. The lines argument specifies the number of lines you want to see at one time. By default, the command line interface shows you 16 lines of text before displaying the prompt: More ...[y n] ?.</p> <p>If you enter 0 for the lines argument, the command line interface displays information as an uninterrupted stream (which is useful for capturing information to a text file).</p>

Port Renumbering Settings

If you use NAT pinholes to forward HTTP or telnet traffic through your Cayman Gateway to an internal host, you must change the port numbers the Cayman Gateway uses for its own configuration traffic. For example, if you set up a NAT pinhole to forward network traffic on Port 80 (HTTP) to another host, you would have to tell the Cayman Gateway to listen for configuration connection requests on a port number other than 80, such as 6080.

After you have changed the port numbers the Cayman Gateway uses for its configuration traffic, you must use those port numbers instead of the standard numbers when configuring the Cayman Gateway. For example, if you move the router's Web service to port "6080" on a box with a DNS name of "superbox", you would enter the URL **http://superbox:6080** in a Web browser to open the Cayman Gateway graphical user interface. Similarly, you would have to configure your telnet application to use the appropriate port when opening a configuration connection to your Cayman Gateway.

BOTH	set servers web-http [0 - 32767]
	<p>Specifies the port number for HTTP (web) communication with the Cayman Gateway. Because port numbers in the range 0-1024 are used by other protocols, you should use numbers in the range 2000-32767 when assigning new port numbers to the Cayman Gateway web configuration interface.</p>

BOTH	set servers telnet-tcp [0 - 32767]
-------------	---

Specifies the port number for telnet (CLI) communication with the Cayman Gateway. Because port numbers in the range 0-1024 are used by other protocols, you should use numbers in the range 2000-32767 when assigning new port numbers to the Cayman Gateway telnet configuration interface.

Security Settings

Security settings include the Firewall and IPsec parameters. All of the security functionality is keyed.

Firewall Settings (for BreakWater Firewall).

BOTH	set ip security firewall option (ClearSailing) {ClearSailing SilentRunning LANdLocked}
-------------	---

The 3 settings for BreakWater are discussed in detail on [page 69](#).

SafeHarbour IPsec Settings

SafeHarbour VPN is a tunnel between the local network and another geographically dispersed network that is interconnected over the Internet. This VPN tunnel provides a secure, cost-effective alternative to dedicated leased lines. Internet Protocol Security (IPsec) is a series of services including encryption, authentication, integrity, and replay protection. Internet Key Exchange (IKE) is the key management protocol of IPsec that establishes keys for encryption and decryption. Because this VPN software implementation is built to these standards, the other side of the tunnel can be either another Cayman unit or another IPsec/IKE based security product. For VPN you can choose to have traffic authenticated, encrypted, or both.

When connecting the Cayman unit in a telecommuting scenario, the corporate VPN settings will dictate the settings to be used in the Cayman unit. If a parameter has not been specified from the other end of the tunnel, choose the default unless you fully understand the ramifications of your parameter choice.

BOTH	set security ipsec nat-enable (off) {on off}
-------------	---

This enables Network Address Translation (NAT) over the SafeHarbour tunnel.

BOTH	set security ipsec option (off) {on off}
-------------	---

Turns on the SafeHarbour IPsec tunnel capability.

BOTH	set security ipsec tunnels name "123"
-------------	--

The name of the tunnel can be quoted to allow special characters and embedded spaces.

BOTH	set security ipsec tunnels name "123" tun-enable (on) {on off}
	This enables this particular tunnel. Currently, one tunnel is supported.
BOTH	set security ipsec tunnels name "123" dest-ext-address <i>ip-address</i>
	Specifies the IP address of the destination gateway.
BOTH	set security ipsec tunnels name "123" dest-int-network <i>ip-address</i>
	Specifies the IP address of the destination computer or internal network.
BOTH	set security ipsec tunnels name "123" dest-int-netmask <i>netmask</i>
	Specifies the subnet mask of the destination computer or internal network. The subnet mask specifies which bits of the 32-bit IP address represents network information. The default subnet mask for most networks is 255.255.255.0 (class C subnet mask).
BOTH	set security ipsec tunnels name "123" encrypt-protocol (ESP) { ESP none }
	See page 73 for details about SafeHarbour IPsec tunnel capability.
BOTH	set security ipsec tunnels name "123" auth-protocol (ESP) {AH ESP none}
	See page 73 for details about SafeHarbour IPsec tunnel capability.
BOTH	set security ipsec tunnels name "123" IKE-mode pre-shared-key-type (hex) {ascii hex}
	See page 73 for details about SafeHarbour IPsec tunnel capability.
BOTH	set security ipsec tunnels name "123" IKE-mode pre-shared-key ("") {hex string}
	See page 73 for details about SafeHarbour IPsec tunnel capability. Example: 0x1234)
BOTH	set security ipsec tunnels name "123" IKE-mode neg-method (main) {main aggressive}
	See page 73 for details about SafeHarbour IPsec tunnel capability. Note: <i>Aggressive Mode</i> is a little faster, but it does not provide identity protection for negotiations nodes.

BOTH	set security ipsec tunnels name "123" IKE-mode DH-group (1) { 1 2 5 }
	See page 73 for details about SafeHarbour IPsec tunnel capability.
BOTH	set security ipsec tunnels name "123" IKE_mode isakmp-SA-encrypt (DES) {DES 3DES Blowfish CAST}
	See page 73 for details about SafeHarbour IPsec tunnel capability.
BOTH	set security ipsec tunnels name "123" isakmp-SA-hash (MD5) {MD5 SHA1}
	See page 73 for details about SafeHarbour IPsec tunnel capability.
BOTH	set security ipsec tunnels name "123" PFS-DH-group (off) {off 1 2 5 }
	See page 73 for details about SafeHarbour IPsec tunnel capability.

Internet Key Exchange (IKE) Settings

The following four IPsec parameters configure the rekeying event.

BOTH	set security ipsec tunnels name "123" IKE-mode ipsec-soft-mbytes (1000) {1-1000000}
BOTH	set security ipsec tunnels name "123" IKE-mode ipsec-soft-seconds (82800) {60-1000000}
BOTH	set security ipsec tunnels name "123" IKE-mode ipsec-hard-mbytes (1200) {1-1000000}
BOTH	set security ipsec tunnels name "123" IKE-mode ipsec-hard-seconds (86400) {60-1000000}

- The **soft** parameters designate when the system negotiates a new key. For example, after 82800 seconds (23 hours) or 1 Gbyte has been transferred (whichever comes first) the key will be renegotiated.
- The **hard** parameters indicate that the renegotiation must be complete or the tunnel will be disabled. For example, 86400 seconds (24 hours) means that the renegotiation must be complete within one day.

Both ends of the tunnel set parameters, and typically they will be the same. If they are not the same, the rekey event will happen when the longest time period expires or when the largest amount of data has been sent.

SNMP Settings

The Simple Network Management Protocol (SNMP) lets a network administrator monitor problems on a network by retrieving settings on remote network devices. The network administrator typically runs an SNMP management station program on a local host to obtain information from an SNMP agent such as the Cayman Gateway.

BOTH

set snmp community *name*

Adds the specified name to the list of communities associated with the Cayman Gateway. By default, the Cayman Gateway is associated with the public community. You can associate as many as 16 communities with the Cayman Gateway.

BOTH

set snmp traps authentication-traps { on | off }

Enables or disables SNMP trapping. If SNMP trapping is enabled, your Cayman Gateway sends authentication traps to all SNMP trap destinations. You must enable trap authentication before you set up your trap destinations.

BOTH

set snmp traps ip-traps *ip-address* [community *community-name*]

Identifies the destination for SNMP trap messages. The *ip-address* argument is the IP address of the host acting as an SNMP console. The optional **community *community-name*** identifies the name of the Cayman Gateway community, which is included in the trap message the device sends to the management console. This name, which is not used for authentication, does not have to match a predefined community name.

BOTH

set snmp sysgroup contact *contact_info*

Identifies the system contact, such as the name, phone number, beeper number, or email address of the person responsible for the Cayman Gateway. You can enter up to 256 characters for the *contact_info* argument. You must put the *contact_info* argument in double-quotes if it contains embedded spaces. .

BOTH

set snmp sysgroup location *location_info*

Identifies the location, such as the building, floor, or room number, of the Cayman Gateway. You can enter up to 256 characters for the *location_info* argument. You must put the *location_info* argument in double-quotes if it contains embedded spaces.

System Settings

You can configure system settings to assign a name to your Cayman Gateway and to specify what types of messages you want the diagnostic log to record.

BOTH

set system name *name*

Specifies the name of your Cayman Gateway. Each Cayman Gateway is assigned a name as part of its factory initialization. The default name for a Cayman Gateway consists of the word "Cayman-2E" and the serial number of the device; for example, Cayman-2E810700. A system name can be 1-64 characters long. Once

you have assigned a name to your Cayman Gateway, you can enter that name in the *Address* text field of your browser to open a connection to your Cayman Gateway.



Some broadband cable-oriented Service Providers use the **System Name** as an important identification and support parameter. If your Gateway is part of this type of network, do **NOT** alter the System Name unless specifically instructed by your Service Provider

BOTH

set system diagnostic-level *level*

Specifies the types of log messages you want the Cayman Gateway to record. All messages with a level number equal to or greater than the level you specify are recorded. For example, if you specify set system diagnostic-level 3, the diagnostic log will retain high-level informational messages (level 3), warnings (level 4), and failure messages (level 5).

Use the following values for the *level* argument:

- **1** or **low** - Low-level informational messages or greater; includes trivial status messages.
- **2** or **medium** - Medium-level informational messages or greater; includes status messages that can help monitor network traffic.
- **3** or **high** - High-level informational messages or greater; includes status messages that may be significant but do not constitute errors.
- **4** or **warning** - Warnings or greater; includes recoverable error conditions and useful operator information.
- **5** or **failure** - Failures; includes messages describing error conditions that may not be recoverable.

BOTH

set system password { admin | user }

Specifies the administrator or user password for a Cayman Gateway. When you enter the **set system password** command, you are prompted to enter the old password (if any) and new password. You are prompted to repeat the new password to verify that you entered it correctly the first time. To prevent anyone from observing the password you enter, characters in the old and new passwords are not displayed as you type them.

A password can be as many as eight characters. Passwords are case-sensitive.

Passwords go into effect immediately. You do not have to restart the Cayman Gateway for the password to take effect. Assigning an administrator or user password to a Cayman Gateway does not affect communications through the device.

Traffic Shaping Settings

Traffic shaping lets you control how much traffic can flow through an Ethernet interface by limiting the size of the WAN “pipe.” This function is most suitable for Internet Service Providers or multi-interface routers.

When you use the traffic-shaping option to set the maximum speed for a router port, the router will silently discard any packets that exceed the maximum port speed.

ENET**set trafficshape option { on | off }**

Enables or disables traffic-shaping in the Cayman Gateway.

ENET**set trafficshape ethernet option { on | off }**

Enables or disables traffic-shaping on the designated Ethernet interface.

ENET**set trafficshape ethernet rate [56000 - 10000000]**

Specifies the maximum number of bits that can be transmitted.



10Base2	IEEE 802.3 specification for Ethernet that uses thin coaxial cable to run at 10 Mbps. Limited to 185 meters per segment.
10Base5	IEEE 802.3 baseband physical layer specification for Ethernet that uses thick coaxial cable to run at 10 Mbps. Limited to 500 meters per segment.
10Base-T	IEEE 802.3 specification for Ethernet that uses unshielded twisted pair (UTP) wiring with RJ-45 eight-conductor plugs at each end. Runs at 10 Mbps.

-----A-----

ACK	Acknowledgment. Message sent from one network device to another to indicate that some event has occurred. See NAK.
access rate	Transmission speed, in bits per second, of the circuit between the end user and the network.
adapter	Board installed in a computer system to provide network communication capability to and from that computer system.
address mask	See subnet mask.
ADSL	Asymmetric Digital Subscriber Line. Modems attached to twisted pair copper wiring that transmit 1.5–9 Mbps downstream (to the subscriber) and 16–640 kbps upstream, depending on line distance.
AH	The A uthentication H eder provides data origin authentication, connectionless integrity, and anti-replay protection services. It protects all data in a datagram from tampering, including the fields in the header that do not change in transit. Does not provide confidentiality.
ANSI	American National Standards Institute.
ASCII	American Standard Code for Information Interchange (pronounced ASK-ee). Code in which numbers from 0 to 255 represent individual characters, such as letters, numbers, and punctuation marks; used in text representation and communication protocols.
asynchronous communication	Network system that allows data to be sent at irregular intervals by preceding each octet with a start bit and following it with a stop bit. Compare synchronous communication.
AUI	Attachment Unit Interface. Connector by which a thick (802.3) Ethernet transceiver cable is attached to a networked device.
Auth Protocol	Authentication Protocol for IP packet header. The three parameter values are None, Encapsulating Security Payload (ESP) and Authentication Header (AH).

-----B-----

backbone	The segment of the network used as the primary path for transporting traffic between network segments.
baud rate	Unit of signaling speed equal to the number of number of times per second a signal in a communications channel varies between states. Baud is synonymous with bits per second (bps) if each signal represents one bit.
binary	Numbering system that uses only zeros and ones.
Blowfish	A 64-bit block cipher, contains a variable length key of maximum 448 bits.

bps	Bits per second. A measure of data transmission speed.
BRI	Basic Rate Interface. ISDN standard for provision of low-speed ISDN services (two B channels (64 kbps each) and one D channel (16 kbps)) over a single wire pair.
bridge	Device that passes packets between two network segments according to the packets' destination address.
broadcast	Message sent to all nodes on a network.
broadcast address	Special IP address reserved for simultaneous broadcast to all network nodes.
buffer	Storage area used to hold data until it can be forwarded.
-----C-----	
carrier	Signal suitable for transmission of information.
CAST	Encryption algorithm using variable key length of maximum 128 bits.
CCITT	Comité Consultatif International Télégraphique et Téléphonique or Consultative Committee for International Telegraph and Telephone. An international organization responsible for developing telecommunication standards.
CD	Carrier Detect.
CHAP	Challenge-Handshake Authentication Protocol. Security protocol in PPP that prevents unauthorized access to network services. See RFC 1334 for PAP specifications Compare PAP.
client	Network node that requests services from a server.
CPE	Customer Premises Equipment. Terminating equipment such as terminals, telephones and modems that connects a customer site to the telephone company network.
CO	Central Office. Typically a local telephone company facility responsible for connecting all lines in an area.
compression	Operation performed on a data set that reduces its size to improve storage or transmission rate.
crossover cable	Cable that lets you connect a port on one Ethernet hub to a port on another Ethernet hub. You can order an Ethernet crossover cable from network supply companies such as Black Box.
CSU/DSU	Channel Service Unit/Data Service Unit. Device responsible for connecting a digital circuit, such as a T1 link, with a terminal or data communications device.
CTS	Clear to Send. Circuit activated in hardware flow control when a modem (or other DCE) is ready to accept data from the computer (or other DTE). Compare RTS, xon/xoff.
-----D-----	
data bits	Number of bits used to make up a character.
datagram	Logical grouping of information sent as a network-layer unit. Compare frame, packet.
DCE	Digital Communication Equipment. Device that connects the communication circuit to the network end node (DTE). A modem and a CSU/DSU are examples of a DCE.
dedicated line	Communication circuit that is used exclusively to connect two network devices. Compare dial on demand.
DES	Data Encryption Standard is a 56-bit encryption algorithm developed by the U.S. National Bureau of Standards (now the National Institute of Standards and Technology).

3DES	Triple DES, with a 168 bit encryption key, is the most accepted variant of DES.
DH Group	Diffie–Hellman is a public key algorithm used between two systems to determine and deliver secret keys used for encryption. Groups 1, 2 and 5 are supported. Also, see Diffie–Hellman listing.
DHCP	Dynamic Host Configuration Protocol. A network configuration protocol that lets a router or other device assign IP addresses and supply other network configuration information to computers on your network.
dial in	Port setting that specifies that other routers can initiate a connection to the local router but that the local router cannot initiate a connection to other routers. A port can be set as both dial in and dial out. Compare dial out.
dial on demand	Communication circuit opened over standard telephone lines when a network connection is needed.
dial out	Port setting that specifies that it can initiate a connection to other routers but that other routers cannot initiate a connection to it. A port can be set as both dial in and dial out. Compare dial in.
Diffie-Hellman	A group of key-agreement algorithms that let two computers compute a key independently without exchanging the actual key. It can generate an unbiased secret key over an insecure medium.
domain name	Name identifying an organization on the Internet. Domain names consists of sets of characters separated by periods (dots). The last set of characters identifies the type of organization (.GOV, .COM, .EDU) or geographical location (.US, .SE).
domain name server	Network computer that matches host names to IP addresses in response to Domain Name System (DNS) requests.
Domain Name System (DNS)	Standard method of identifying computers by name rather than by numeric IP address.
DSL	Digital Subscriber Line. Modems on either end of a single twisted pair wire that delivers ISDN Basic Rate Access.
DTE	Data Terminal Equipment. Network node that passes information to a DCE (modem) for transmission. A computer or router communicating through a modem is an example of a DTE device.
DTR	Data Terminal Ready. Circuit activated to indicate to a modem (or other DCE) that the computer (or other DTE) is ready to send and receive data.
-----E-----	
echo interval	Frequency with which the router sends out echo requests.
Enable	This toggle button is used to enable/disable the configured tunnel.
encapsulation	Technique used to enclose information formatted for one protocol, such as AppleTalk, within a packet formatted for a different protocol, such as TCP/IP.
Encrypt Protocol	Encryption protocol for the tunnel session. Parameter values supported include NONE or ESP.
encryption	The application of a specific algorithm to a data set so that anyone without the encryption key cannot understand the information.

ESP	Encapsulation Security Payload (ESP) header provides confidentiality, data origin authentication, connectionless integrity, anti-replay protection, and limited traffic flow confidentiality. It encrypts the contents of the datagram as specified by the Security Association. The ESP transformations encrypt and decrypt portions of datagrams, wrapping or unwrapping the datagram within another IP datagram. Optionally, ESP transformations may perform data integrity validation and compute an Integrity Check Value for the datagram being sent. The complete IP datagram is enclosed within the ESP payload.
Ethernet crossover cable	See crossover cable.
-----F-----	
FCS	Frame Check Sequence. Data included in frames for error control.
flow control	Technique using hardware circuits or control characters to regulate the transmission of data between a computer (or other DTE) and a modem (or other DCE). Typically, the modem has buffers to hold data; if the buffers approach capacity, the modem signals the computer to stop while it catches up on processing the data in the buffer. See CTS, RTS, xon/xoff.
fragmentation	Process of breaking a packet into smaller units so that they can be sent over a network medium that cannot transmit the complete packet as a unit.
frame	Logical grouping of information sent as a link-layer unit. Compare datagram, packet.
FTP	File Transfer Protocol. Application protocol that lets one IP node transfer files to and from another node.
FTP server	Host on network from which clients can transfer files.
-----H-----	
Hard MBytes	Setting the Hard MBytes parameter forces the renegotiation of the IPsec Security Associations (SAs) at the configured Hard MByte value. The value can be configured between 1 and 1,000,000 MB and refers to data traffic passed.
Hard Seconds	Setting the Hard Seconds parameter forces the renegotiation of the IPsec Security Associations (SAs) at the configured Hard Seconds value. The value can be configured between 60 and 1,000,000 seconds.
hardware handshake	Method of flow control using two control lines, usually Request to Send (RTS) and Clear to Send (CTS).
HDLC	High-level Data Link Control.
HDSL	High-data-rate Digital Subscribe Line. Modems on either end of one or more twisted pair wires that deliver T1 or E1 speeds. T1 requires two lines and E1 requires three. Compare ADSL, SDSL.
header	The portion of a packet, preceding the actual data, containing source and destination addresses and error-checking fields.
HMAC	Hash-based Message Authentication Code
hop	A unit for measuring the number of routers a packet has passed through when traveling from one network to another.
hop count	Distance, measured in the number of routers to be traversed, from a local router to a remote network. See metric.
hub	Another name for a repeater. The hub is a critical network element that connects everything to one centralized point. A hub is simply a box with multiple ports for network connections. Each device on the network is attached to the hub via an Ethernet cable.

-----I-----	
IKE	Internet K ey E xchange protocol provides automated key management and is a preferred alternative to manual key management as it provides better security. Manual key management is practical in a small, static environment of two or three sites. Exchanging the key is done through manual means. Because IKE provides automated key exchange, it is good for larger, more dynamic environments.
INSPECTION	The best option for Internet communications security is to have an SMLI firewall constantly inspecting the flow of traffic: determining direction, limiting or eliminating inbound access, and verifying down to the packet level that the network traffic is only what the customer chooses. The Cayman Gateway works like a network super traffic cop, inspecting and filtering out undesired traffic based on your security policy and resulting configuration.
interface	A connection between two devices or networks.
internet address	IP address. A 32-bit address used to route packets on a TCP/IP network. In dotted decimal notation, each eight bits of the 32-bit number are presented as a decimal number, with the four octets separated by periods.
IPCP	Internet Protocol Control Protocol. A network control protocol in PPP specifying how IP communications will be configured and operated over a PPP link.
IPSEC	A protocol suite defined by the Internet Engineering Task Force to protect IP traffic at packet level. It can be used for protecting the data transmitted by any service or application that is based on IP, but is commonly used for VPNs.
ISAKMP	Internet S ecurity A ssociation and K ey M anagement P rotocol is a framework for creating connection specific parameters. It is a protocol for establishing, negotiating, modifying, and deleting SAs and provides a framework for authentication and key exchange. ISAKMP is a part of the IKE protocol.
ISDN	Integrated Services Digital Network. A digital network with circuit and packet switching for voice and data communications at data rates up to 1.544 or 2.048 Mbps over telephone networks.
-----K-----	
Key Management	The Key Management algorithm manages the exchange of security keys in the IPsec protocol architecture. SafeHarbour supports the standard <i>Internet Key Exchange (IKE)</i>
-----L-----	
LCP	Link Control Protocol. Protocol responsible for negotiating connection configuration parameters, authenticating peers on the link, determining whether a link is functioning properly, and terminating the link. Documented in RFC 1331.
LQM Link Quality Monitoring	Optional facility that lets PPP make policy decisions based on the observed quality of the link between peers. Documented in RFC 1333.
loopback test	Diagnostic procedure in which data is sent from a device's output channel and directed back to its input channel so that what was sent can be compared to what was received.

-----M-----	
magic number	Random number generated by a router and included in packets it sends to other routers. If the router receives a packet with the same magic number it is using, the router sends and receives packets with new random numbers to determine if it is talking to itself.
MD5	A 128-bit, message-digest , authentication algorithm used to create digital signatures. It computes a secure, irreversible, cryptographically strong hash value for a document. Less secure than variant SHA-1.
metric	Distance, measured in the number of routers a packet must traverse, that a packet must travel to go from a router to a remote network. A route with a low metric is considered more efficient, and therefore preferable, to a route with a high metric. See hop count.
modem	Modulator/demodulator. Device used to convert a digital signal to an analog signal for transmission over standard telephone lines. A modem at the other end of the connection converts the analog signal back to a digital signal.
MRU	Maximum Receive Unit. The maximum packet size, in bytes, that a network interface will accept.
MTU	Maximum Transmission Unit. The maximum packet size, in bytes, that can be sent over a network interface.
MULTI-LAYER	The Open System Interconnection (OSI) model divides network traffic into seven distinct levels, from the Physical (hardware) layer to the Application (software) layer. Those in between are the Presentation, Session, Transport, Network, and Data Link layers. Simple first and second generation firewall technologies inspect between 1 and 3 layers of the 7 layer model, while our SMLI engine inspects layers 2 through 7.
-----N-----	
NAK	Negative acknowledgment. See ACK.
Name	The Name parameter refers to the name of the configured tunnel. This is mainly used as an identifier for the administrator. The Name parameter is an ASCII and is limited to 31 characters. The tunnel name is the only IPSec parameter that does not need to match the peer gateway.
NCP	Network Control Protocol.
Negotiation Method	This parameter refers to the method used during the Phase I key exchange, or IKE process. SafeHarbour supports Main or Aggressive Mode. Main mode requires 3 two-way message exchanges while Aggressive mode only requires 3 total message exchanges.
null modem	Cable or connection device used to connect two computing devices directly rather than over a network.
-----P-----	
packet	Logical grouping of information that includes a header and data. Compare frame, datagram.
PAP	Password Authentication Protocol. Security protocol within the PPP protocol suite that prevents unauthorized access to network services. See RFC 1334 for PAP specifications. Compare CHAP.
parity	Method of checking the integrity of each character received over a communication channel.
Peer External IP Address	The Peer External IP Address is the public, or routable IP address of the remote gateway or VPN server you are establishing the tunnel with.

Appendix B

Peer Internal IP Network	The Peer Internal IP Network is the private, or Local Area Network (LAN) address of the remote gateway or VPN Server you are communicating with.
Peer Internal IP Netmask	The Peer Internal IP Netmask is the subnet mask of the Peer Internal IP Network.
PFS-DH	Perfect Forward Secrecy Diffie Hellman Group. PFS forces a DH negotiation during Phase II of IKE-IPSec SA exchange. You can disable this or select a DH group 1, 2, or 5. PFS is a security principle that ensures that any single key being compromised will permit access to only data protected by that single key. In PFS, the key used to protect transmission of data must not be used to derive any additional keys. If the key was derived from some other keying material, that material must not be used to derive any more keys.
PING	Packet INternet Groper. Utility program that uses an ICMP echo message and its reply to verify that one network node can reach another. Often used to verify that two hosts can communicate over a network.
PPP	Point-to-Point Protocol. Provides a method for transmitting datagrams over serial router-to-router or host-to-network connections using synchronous or asynchronous circuits.
Pre-Shared Key	The Pre-Shared Key is a parameter used for authenticating each side. The value can be an ASCII or Hex and a maximum of 64 characters.
Pre-Shared Key Type	The Pre-Shared Key Type classifies the Pre-Shared Key. SafeHarbour supports <i>ASCII</i> or <i>HEX</i> types
protocol	Formal set of rules and conventions that specify how information can be exchanged over a network.
PSTN	Public Switched Telephone Network.
-----R-----	
repeater	Device that regenerates and propagates electrical signals between two network segments. Also known as a hub.
RFC	Request for Comment. Set of documents that specify the conventions and standards for TCP/IP networking.
RIP	Routing Information Protocol. Protocol responsible for distributing information about available routes and networks from one router to another.
RJ-45	Eight-pin connector used for 10BaseT (twisted pair Ethernet) networks.
route	Path through a network from one node to another. A large internet-work can have several alternate routes from a source to a destination.
routing table	Table stored in a router or other networking device that records available routes and distances for remote network destinations.
RTS	Request to Send. Circuit activated in hardware flow control when a computer (or other DTE) is ready to transmit data to a modem (or other DCE). See CTS, xon/xoff.
-----S-----	
SA Encrypt Type	SA Encryption Type refers to the symmetric encryption type. This encryption algorithm will be used to encrypt each data packet. SA Encryption Type values supported include <i>DES</i> , <i>3DES</i> , <i>CAST</i> and <i>Blowfish</i> .
SA Hash Type	SA Hash Type refers to the Authentication Hash algorithm used during SA negotiation. Values supported include <i>MD5</i> <i>SHA1</i> . N/A will display if NONE is chose for Auth Protocol.

Security Association	<p>From the IPSEC point of view, an SA is a data structure that describes which transformation is to be applied to a datagram and how. The SA specifies:</p> <ul style="list-style-type: none"> • The authentication algorithm for AH and ESP • The encryption algorithm for ESP • The encryption and authentication keys • Lifetime of encryption keys • The lifetime of the SA • Replay prevention sequence number and the replay bit table <p>An arbitrary 32-bit number called a Security Parameters Index (SPI), as well as the destination host's address and the IPSEC protocol identifier, identify each SA. An SPI is assigned to an SA when the SA is negotiated. The SA can be referred to by using an SPI in AH and ESP transformations. SA is unidirectional. SAs are commonly setup as bundles, because typically two SAs are required for communications. SA management is always done on bundles (setup, delete, relay).</p>
serial communication	Method of data transmission in which data bits are transmitted sequentially over a communication channel
SHA-1	An implementation of the U.S. Government Secure Hash Algorithm ; a 160-bit authentication algorithm.
SLIP	Serial Line Internet Protocol. Predecessor to PPP that allows communication over serial point-to-point connections running TCP/IP. Defined in RFC 1055.
Soft MBytes	Setting the Soft MBytes parameter forces the renegotiation of the IPsec Security Associations (SAs) at the configured Soft MByte value. The value can be configured between <i>1 and 1,000,000 MB</i> and refers to data traffic passed. If this value is not achieved, the Hard MBytes parameter is enforced.
Soft Seconds	Setting the Soft Seconds parameter forces the renegotiation of the IPsec Security Associations (SAs) at the configured Soft Seconds value. The value can be configured between 60 and 1,000,000 seconds.
SPI	The Security Parameter Index is an identifier for the encryption and authentication algorithm and key. The SPI indicates to the remote firewall the algorithm and key being used to encrypt and authenticate a packet. It should be a unique number greater than 255.
STATEFUL	The Cayman Gateway monitors and maintains the state of any network transaction. In terms of network request-and-reply, state consists of the source IP address, destination IP address, communication ports, and data sequence. The Cayman Gateway processes the stream of a network conversation, rather than just individual packets. It verifies that packets are sent from and received by the proper IP addresses along the proper communication ports in the correct order and that no imposter packets interrupt the packet flow. Packet filtering monitors only the ports involved, while the Cayman Gateway analyzes the continuous conversation stream, preventing session hijacking and denial of service attacks.
static route	Route entered manually in a routing table.
subnet mask	A 32-bit address mask that identifies which bits of an IP address represent network address information and which bits represent node identifier information.
synchronous communication	Method of data communication requiring the transmission of timing signals to keep PPP peers synchronized in sending and receiving blocks of data.

-----T-----		
T1 link		Digital transmission link capable of speeds up to 1 544 kilobits per second.
TA		Terminal adaptor. Device that connects a network or terminal to an ISDN network.
telnet		IP protocol that lets a user on one host establish and use a virtual terminal connection to a remote host.
twisted pair		Cable consisting of two copper strands twisted around each other. The twisting provides protection against electromagnetic interference.
-----U-----		
UTP		Unshielded twisted pair cable.
-----V-----		
VJ		Van Jacobson. Abbreviation for a compression standard documented in RFC 1144.
-----W-----		
WAN		Wide Area Network. Private network facilities, usually offered by public telephone companies but increasingly available from alternative access providers (sometimes called Competitive Access Providers, or CAPs), that link business network nodes.
WWW		World Wide Web.
-----X-----		
xon/xoff		Special characters used for software flow control to regulate communication between a device and a modem.



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